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Singer, B., Palmer, B., Rogers, B., and Smith, J.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Human Systems IAC
2261 Monahan Way, Bldg. 196
WPAFB OH 45433-7022

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Singer, Becky ;
Palmer, Barbara ;
Rogers, Beth ;
Smith, Julie ;

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7. PERFORMING ORGANIZATION NAME AND ADDRESS
Human Systems IAC
2261 Monahan Way, Bldg. 196
WPAFB, OH45433-7022

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Sara.Johnson@wpafb.af.mil

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Military Services Physical Fitness and Weight Management Database: A Review and Analysis

Prepared for: U.S. Army Medical Research and
Materiel Command
Attn: MCMR-PLC
Fort Detrick, MD 21702-5012

Becky Singer
Senior Human Factors Analyst
AFRL/HEC/HSIAC

Barbara Palmer
Senior Human Factors Analyst
AFRL/HEC/HSIAC

Beth Rogers
Senior Human Factors Analyst
AFRL/HEC/HSIAC

Julie Smith
Human Factors Analyst
AFRL/HEC/HSIAC

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EXECUTIVE SUMMARY

The U.S. military services' fitness and weight program reporting requirements are expected to be mandated in the upcoming Department of Defense Instruction (DoDI) 1308.3. In anticipation, service program and research representatives met for a two-day workshop in November 2001. It is anticipated that annual federal reporting on the services' fitness and weight status will be required and enforced.

It will be important for the Department of Defense (DoD) to have accurate data on the impact of fitness and weight-control policies. Recent claims that half of all service members are obese and recurring assumptions that the DoD is becoming increasingly less fit, along with national civilian trends, have raised public concern about military readiness. These issues could be addressed through the availability of the data, scientifically valid analysis of the data, and a reliable reporting system.

During the two-day workshop, service representatives presented their fitness and weight program policies and the status of the services' databases. Discussion focused on the benefits of data-gathering consistency among the services, a centralized database, and requisite security and access issues. The benefits to the DoD and issues involved in addressing the upcoming reporting requirement through a single, central, and scientifically respected organization were carefully considered in this workshop.

Initially, the most pressing issues for the services are to answer DoDI queries and to address their own current body composition and fitness issues that necessitate the establishment of databases. These databases should be combined for DoD reporting requirements and be able to link to injury and epidemiology databases so as to allow documentation of important relationships between fitness status and injury rates, the number of sick days, job performance, and combat readiness. The combined databases would allow the DoD to perform analyses that would allow feedback at the level of the service member on his or her fitness status relative to some appropriate service unit. These analyses could serve as a *Personal Fitness Assistant* and prescribe an individualized fitness-weight-training regime based on the service member's occupational group, current fitness status, and age. Specific encouragement could also be tailored to the individual, based on that person's stage of readiness to undertake a new fitness program.

Workshop Action Items

- This document is one of the action items called for at the workshop. It is to contain a notional description of a possible system for data acquisition, storage, data management, and statistical analysis.

- A standing committee, such as the group that participated in the current workshop, could continue to meet as this project progresses. The next meeting should follow approval of the DoDI and include consideration of the services' proposed response to the requirements and to the concept of a centralized database with standardized data collection, data management, statistical analysis, and data reporting.

- The centralized database system should be flexible to accommodate each service's needs while maintaining consistency across the services for the DoD. A survey of users' needs and an outline of the database from each service would be useful to ensure that the centralized database will be relevant and helpful.

- Any central database activity must be fully coordinated and incorporated with existing DoD personnel, health monitoring, and other medical database and surveillance activities to ensure

maximal efficiency and benefit (e.g., complete coordination with Composite Health Care System II [CHCSII], Theater Medical Information Program [TMIP], etc.).

- To provide sound and helpful assessments of service-specific issues and credible evaluations of new fitness initiatives or programs, physical readiness trends should be interpreted by subject-matter experts.

This document is divided into four sections. Part 1 contains background information describing the status of each service's physical fitness and weight program, Part 2 reviews existing DoD military and civilian databases, Part 3 consists of the workshop discussion dialogue associated with each topic area, and finally, Part 4 contains a description of a potential database system. This report presents a review of the material covered at the workshop and the recommendations to expedite a coordinated effort once the DoDI 1308.3 is released. The opinions and assertions contained within are not to be construed as official views of the Department of Defense or any of the other Departments represented in this meeting.

1. CURRENT MILITARY PHYSICAL FITNESS AND WEIGHT MANAGEMENT PROGRAMS

This section documents the current state of the military services' physical fitness and body composition programs and data collection. The policy and governance of these programs are introduced and the methods of implementation and the roles of service members to meet the standards declared by each respective service are explained. These descriptions include data collection procedures and data storage facilities, if applicable. The information for this section was collected through comprehensive literature and internet searches, as well as interviews with database designers and maintainers.

1.1 Introduction

In November 1998, the General Accounting Office (GAO) published a report entitled *Gender Issues: Improved Guidance and Oversight Are Needed to Ensure Validity and Equity of Fitness Standards, GAO/NSIAD-99-9* (U.S. General Accounting Office, 1998). This report reviewed the military services' physical fitness and body fat standards. It was determined that there were significant differences among the services' standards and tests without any sound basis for the differences. In addition, the report indicated that standards for gender and age were not always scientifically based and that the Department of Defense (DoD) oversight of the fitness programs had not always been adequate.

The GAO/NSIAD-99 reports the existing differences in the services' approaches to setting and assessing service-wide general fitness standards and how these are affected by gender and age. Each of the four branches (Army, Navy, Air Force, and Marine Corps) has different requirements and testing procedures. All of the physical fitness programs promote general physical readiness and do not employ occupational requirements. Subsequent to this GAO report, the DoD is revising its guidelines regarding physical fitness and body fat programs among the services in DoD Directive (DoDD) 1308.1, *DoD Physical Fitness and Body Fat Program* (U.S. Department of Defense, 1995) accompanied by DoD Instruction (DoDI) 1308.3, *DoD Physical Fitness and Body Fat Programs Procedures* (U.S. Department of Defense, 1995).

DoDD 1308.1 governs the physical fitness and body fat standards of the military services. This directive encompasses policy for establishing the maximum allowable percent body fat among service members, the requirement to measure body fat if screening weights are exceeded, the minimum allowable standard for body fat, and the requirement to conduct physical fitness evaluations at least annually. DoDI 1308.3 implements this policy, assigns responsibilities, and prescribes the procedures governing physical fitness and body fat standards.

Physical fitness and body composition receive attention throughout the services and DoD. The Office of the Assistant Secretary of Defense for Force Management Policy (under the Under Secretary of Defense for Personnel and Readiness) monitors the DoD Physical Fitness and Body Fat Program and coordinates it with health promotion and injury prevention programs. The Assistant Secretary of Defense for Health Affairs (also under the Under Secretary of Defense for Personnel and Readiness) ensures that the military services establish a health promotion program in conjunction with their Physical Fitness and Body Fat programs.

The secretaries of the military departments establish, within their respective service, a physical fitness and body fat program consistent with DoDI 1308.3, which complements the health promotion program as declared by the Office of Assistant Secretary of Defense for Health Affairs. Figure 1 diagrams the physical fitness, body composition, weight-management guidance structure, and the accompanying documents for each level and service. Each military service is responsible for developing and maintaining physical readiness programs which should include, at a minimum, annual fitness testing

against a service-appropriate standard for aerobic capacity, muscular strength, and endurance. The physical fitness programs should include lifestyle enhancement programs to improve general health and fitness and encourage all civilian employees, family members, and retirees in the DoD to participate in these programs.

DoD
- Directive 1308.1 (July 1995), *DoD Physical Fitness and Body Fat Programs*
- Instruction 1308.3 (Aug 1995), *DoD Physical Fitness and Body Fat Programs Procedures*

U.S. Army
- Regulation 350-41 (Mar 1993), *Training in Units*
- Regulation 600-9 (Sept 1986), *The Army Weight Control Program*
- Regulation 600-63 (Nov 1987), *Army Health Promotion*
- Army Field Manual 21-20 (Sept 1992), *Physical Fitness Training*

U.S. Navy
- Naval Operations Instruction 6110.1F (May 2000), *Physical Readiness Program*
- Naval Operations Instruction 6100.2 (Feb 1992), *Health Promotion Program*
- BUPERSINST 6110.3 (Dec 1994), *Health and Physical Readiness Program*

U.S. Air Force
- Policy Directive 40-5 (Dec 1997), *Fitness and Weight Management*
- Instruction 40-501 (Sept 2000), *The Air Force Fitness Program*
- Instruction 40-502 (April 2002), *The Weight and Body Fat Management Program*

U.S. Marine Corps
- Order 6100.3J W/CH 1-3 (Feb 1988), *Physical Fitness*
- Order 6100.10B W/CH 1-4 (Mar 1993), *Weight Control and Military Appearance*
- Order P1700.29 (Nov 1999), *Marine Corps Semper Fit Program Manual*

Figure 1. Physical fitness, body composition, and weight-management guidance

1.2 U.S. Army

1.2.1 U.S. Army Health Promotion Program

The U.S. Army uses a holistic approach to health promotion and weight control. This program is not only important for service members, but also for their families and the civilian force. The Army's Health Promotion policy is governed by Army Regulation (AR) 600-63, *Army Health Promotion* (U.S. Department of the Army, 1987) which states:

> The goal of the Army Health Promotion Program is to maximize readiness, combat efficiency, and work performance. Objectives include enhancing the quality of life for all service members, Army civilians, family members and retirees; and encouraging lifestyles to improve and protect physical, emotional, and spiritual health.

Physical fitness includes cardiorespiratory fitness, muscular strength and endurance, flexibility, and body composition. These factors all contribute to effective physical training and activity. Service members participate in a physical fitness program that is established by their commanders and supervisors. This program is to be consistent with Field Manual (FM) 21-20, *Physical Fitness Training* (U.S. Department of the Army, 1992) and the unit mission.

Civilians who work for the U.S. Army are also encouraged to participate in a regular exercise program. With their supervisor's permission, civilians may participate in a command-sponsored program for up to three hours of administrative leave per week for up to six months (AR 600-63, 1987). This includes physical exercise training, monitoring, and/or education. These programs may be repeated if the employee desires; however, the individual will not be granted administrative leave if such training has already been received.

1.2.2 U.S. Army Physical Fitness Test

The U.S. Army Physical Fitness Test (APFT) consists of the following three events – the maximum number of extended-leg push-ups completed in two minutes, the maximum number of bent-knee sit-ups completed in two minutes, and a timed two-mile run. Scoring of these events differs by gender and age (Appendix A, Table 4). The APFT is administered to all personnel on a biannual basis with a minimum of four months separating the tests. AR 350-41, *Training in Units* (U.S. Department of the Army, 1993) states that all soldiers in the active Army, Army National Guard, and Army Reserve must take the APFT.

Unless there is a medical reason precluding taking the APFT, all soldiers up to 55 years of age are tested on the three-event APFT. Soldiers 55 years of age and over are given the option of taking the three-event test or the alternate APFT (push-ups, sit-ups, and an alternate aerobic event). Approved alternate aerobic events to replace the two-mile run include a 6.2-mile bike ride, a 2.5-mile walk, or an 800-yard swim (FM 21-20, 1992). The scoring of these events differs by gender and age (Appendix A, Table 5).

Soldiers over 60 years of age have the option of taking the APFT; however, they must maintain a personal physical fitness program approved by a physician and remain within the Army height and weight standards (U.S. Department of the Army, ALARACT 083/01, 2001).

Army Physical Fitness Test Scorecard
For use of this form, see FM 21-20; the proponent agency is TRADOC

NAME (LAST, FIRST MIDDLE)

SSN

GENDER

UNIT

	TEST ONE			TEST TWO			TEST THREE			TEST FOUR	
DATE	GRADE	AGE	DATE	GRADE	AGE	DATE	GRADE	AGE	DATE	GRADE	AGE

HEIGHT (IN INCHES)	BODY COMPOSITION		HEIGHT (IN INCHES)	BODY COMPOSITION		HEIGHT (IN INCHES)	BODY COMPOSITION		HEIGHT (IN INCHES)	BODY COMPOSITION	
	WEIGHT:	BODY FAT:		WEIGHT:	BODY FAT:		WEIGHT:	BODY FAT:		WEIGHT:	BODY FAT:
	___ lbs	___ %		___ lbs	___ %		___ lbs	___ %		___ lbs	___ %
	GO / NO-GO ☐	GO / NO-GO ☐		GO / NO-GO ☐	GO / NO-GO ☐		GO / NO-GO ☐	GO / NO-GO ☐		GO / NO-GO ☐	GO / NO-GO ☐

PU RAW SCORE	INITIALS	POINTS	PU RAW SCORE	INITIALS	POINTS	PU RAW SCORE	INITIALS	POINTS	PU RAW SCORE	INITIALS	POINTS
SU RAW SCORE	INITIALS	POINTS	SU RAW SCORE	INITIALS	POINTS	SU RAW SCORE	INITIALS	POINTS	SU RAW SCORE	INITIALS	POINTS
2MR RAW SCORE	INITIALS	POINTS	2MR RAW SCORE	INITIALS	POINTS	2MR RAW SCORE	INITIALS	POINTS	2MR RAW SCORE	INITIALS	POINTS

ALTERNATE AEROBIC EVENT	TOTAL POINTS	ALTERNATE AEROBIC EVENT	TOTAL POINTS	ALTERNATE AEROBIC EVENT	TOTAL POINTS	ALTERNATE AEROBIC EVENT	TOTAL POINTS
EVENT _____		EVENT _____		EVENT _____		EVENT _____	
TIME _____		TIME _____		TIME _____		TIME _____	
GO ☐ NO-GO ☐		GO ☐ NO-GO ☐		GO ☐ NO-GO ☐		GO ☐ NO-GO ☐	

NCOIC/OIC SIGNATURE	NCOIC/OIC SIGNATURE	NCOIC/OIC SIGNATURE	NCOIC/OIC SIGNATURE
COMMENTS	COMMENTS	COMMENTS	COMMENTS

SPECIAL INSTRUCTION: USE IN K

LEGEND:
PU - PUSH UPS
SU - SIT UPS
2MR - 2 MILE RUN
APFT - ARMY PHYSICAL FITNESS TEST

Data Required by the Privacy Act of 1974
Title DA form 705
Authority 5 USC Section 301
Disclosure of requested information is mandatory.

Individuals not providing information cannot be rated/scored. The principal purpose and routine use of this information are to maintain a record of individual scores on physical fitness events.

DA FORM 705, JUNE 1999
DA FORM 705, JUN 1998, MAY BE USED
USAPA V1.00

Figure 2. DA Form 705 Army Physical Fitness Test scorecard

Individual service members must have a Department of the Army (DA) Form 705 Army Physical Fitness Test scorecard (Figure 2) on record. The event scorer records the raw score (number of push-ups, number of sit-ups, and run time in minutes and seconds) in the appropriate block after the soldier completes each event. Raw scores are converted to point scores using the standards on the back of the scorecard. If a point value falls between two values, then the lower of the two is recorded. The total number of points is tallied and checked for accuracy before the card is signed. These point scores determine whether a service member passes or fails the APFT. After each APFT, the card is placed in a central location in the unit (AR 350-41, 1993). The policy states that the individual military personnel records jacket will accompany the individual at the time of permanent change of station. Once the card is full, after eight tests, a new scorecard is issued. APFT scores from the previous eight tests are not recorded elsewhere or kept.

1.2.2.1 Contingencies – Army Physical Fitness Test

Service members must maintain a minimum score of at least 60 out of 100 points per each of the three events to pass the APFT, resulting in a total score in the range of 180 – 300 points for passing scores. Service members who score 270 or above on the APFT while meeting the body fat standards are awarded the Physical Fitness Badge for physical fitness excellence. In contrast, when a service member fails the APFT, adequate time and assistance are provided to improve his or her performance. However, those service members who repeatedly fail the APFT will either be barred from reenlistment or processed for separation from the service.

1.2.3 U.S. Army – Weight Control Program

The objectives of the Army Weight Control Program are to ensure that all personnel are able to meet the demands of their duties and combat conditions as well as maintain a neat and trim appearance. This is accomplished through procedures for personnel to receive counseling to meet the standards prescribed in AR 600-9, *The Army Weight Control Program* (U.S. Department of the Army, 1986). The program also encourages establishing and maintaining discipline, operational readiness, and optimal health and fitness.

Service members are weighed when they take the APFT or at least every six months (AR 600-9, 1986). One misconception of the Army Weight Control Program is that the service member must maintain a specific weight for a given height. Rather, percent body fat is the actual standard for body composition. The weight-for-height table is used as a primary screening tool. If a soldier exceeds the specified table value, or if the commander or supervisor determines that the soldier does not appear fit, then circumference measurements are taken to assess body composition. Currently, the neck and abdomen are measured for men; the neck, forearm, wrist, and hips are measured for women. The maximum allowable percent body fat limits are 20%-26% and 30%-36% for males and females respectively (Appendix A, Table 6).

Once service members are enrolled in the Weight Control Program, they are provided nutritional counseling and monitored monthly for weight and body fat loss. Service members are given a period of six months to meet the required percent body fat standard. If this goal is not met after two consecutive monthly weigh-ins, and no medical reason is determined for the lack of weight loss, the individual is subject to separation from the service. Satisfactory progress is considered to be a weight loss of 3 to 8 pounds per month or a loss of 1% body fat per month. Once a service member meets the desired percent body fat standard, he or she is removed from the program and monitored for three years. Exceeding the body fat standard within the first year of removal from the Weight Control Program is grounds for immediate discharge. If a soldier is found to exceed the body fat standard two or three years after removal from the Weight Control Program he or she is allowed 90 days to meet the standard.

1.2.3.1 Contingencies – Weight Control Program

To encourage personnel to maintain proper weight and percent body fat standards, commanders and supervisors are required to provide educational and motivational programs. Some of the motivational programs include nutrition education sessions and exercise programs conducted by qualified health care personnel.

If a service member is deemed overweight by the percent body fat standards of AR 600-9, the unit commander will enroll the overweight soldier in the Weight Control Program and monitor him or her for satisfactory weight loss. Once enrolled in the Weight Control Program, the soldier is non-promotable, unauthorized to attend professional military or civilian schooling, and will not be assigned command positions. After six months, if a satisfactory weight loss is not evident a medical evaluation will be given. If the unsatisfactory weight is not a result of a medical condition and is not lost in an appropriate amount of time the service member may be separated.

1.2.4 U.S. Army Pregnancy/Postpartum Program

Personnel who meet with AR 600-9 but become pregnant will be exempt from the standards for the duration of the pregnancy plus a period of 180 days of convalescent leave after the delivery. However, if the service member was enrolled in the Weight Control Program prior to the pregnancy, she will remain flagged for the duration of the pregnancy and must return to the program after the postpartum period.

The Army is developing a standardized Physical Training program for pregnant soldiers. It is currently offered at Fort Bragg, NC, and Fort Hood, TX, and at some of the smaller installations. Service members who participate in a regular exercise program during their pregnancy are much more likely to meet weight requirements and pass the Physical Fitness Test following delivery. Pregnant soldiers have to be assessed by a physician to participate in this five-day-per-week program that consists of three days of fitness and exercise, and two days of nutrition classes and counseling.

1.2.5 U.S. Army Database

The U.S. Army has no database for physical fitness scores and body composition results. Fitness data are kept on a unit-level card that has space for a maximum of eight APFT results. Once the card is full it is replaced with a new card and the previous data are not recorded or kept. Service members exceeding the body fat standard are flagged in their personnel record until he or she departs the service or a superior states that the standards have been met. However, documentation that the service member has been in the Army Weight Control Program is not systematically tracked and therefore does not remain on record.

1.3 U.S. Navy

1.3.1 U.S. Navy Fitness Enhancement Program

Chief of Naval Operations Instruction 6110.1F, *Physical Readiness Program* (Chief of Naval Operations, 2000) provides the policy and procedures for the Navy's Physical Readiness Program (PRP) as ordered by DoDI 1308.3. One of the key components of the PRP is the Fitness Enhancement Program (FEP). This is the command's individualized fitness program that is designed to develop a "lifetime" of behavior. Its purpose is to increase and maintain cardiorespiratory fitness, muscular strength, endurance, and flexibility; and reduce excess body fat, promote fitness, and provide nutritional guidance. It is the command's responsibility to ensure that the FEP meets the needs of all personnel and it is the service member's responsibility to maintain a lifestyle that promotes optimal health as directed by this program.

Service members are to participate in aerobic physical exercise at least three times per week. These sessions, at least 40 minutes in length, should include 20-30 minutes of intense aerobic activity with strength and flexibility components, and warm-up and cool-down periods. In addition, each member should maintain a level of fitness that ensures safe participation in the Physical Fitness Assessment (PFA), the second key component of the PRP.

The PFA is geared toward creating a culture of fitness to enhance a member's ability to complete tasks that support the command's mission and consists of the following three components: Physical Activity Risk Factor Questionnaire, the Physical Readiness Test (PRT), and the body composition assessment.

The Physical Activity Risk Factor Questionnaire identifies initial health risk factors such as smoking, diabetes, high blood pressure, and injury or illness. The objective of this questionnaire is to encourage overall fitness and discourage "testing for the test." This questionnaire is to be completed by all service members 10 to 12 weeks prior to the PRT. If a member answers "yes" to any of the 19 questions on the test, a medical representative is notified and must clear the member prior to participation in the PRT.

At the command level, the PRP is run by the Command Fitness Leader (CFL) per the Commanding Officer and Naval instructions. This is a key role in the PRP and the qualifications are stringent. The CFL must be an E7 or above, be certified in cardiopulmonary resuscitation, a non-user of tobacco products, achieve an overall PRT score of "excellent-low" or better, and be within maximum weight-for-height standards or no more than 21 percent body fat for males or 32 percent for females. In addition, the CFL must complete a COMNAVPERSCOM-approved five-day CFL certification course. This is an intensive

course that provides the training and skills to conduct an effective PRP at sea or on shore. Personnel successfully completing the training receive certification as a Physical Fitness Specialist certified by the Cooper Institute of Aerobic Research.

The CFL is responsible for scheduling and announcing all official PFAs and advising his or her chain of command on all PRP matters. They are to oversee all aspects of the program, including instructing assistant CFLs in conducting the components of the PFA, reporting any injuries related to the PRP to the command safety officer, monitoring members in BUMED-approved weight management programs, and providing the command with the results of each PFA.

1.3.2 U.S. Navy Physical Readiness Test

The Physical Readiness Test (PRT) is a series of four events: the sit-and-reach, in which the service member reaches forward and touches his or her toes for one second; perform as many curl-ups as possible in two minutes; perform as many push-ups as possible in two minutes; and a 1.5-mile walk/run or a 500-yard/450 meter swim (Appendix A, Table 4).

The PRT uses "goal-oriented" scoring to encourage service members to improve their performance. It consists of multi-tiered fitness categories and levels. There are four performance categories: Outstanding, Excellent, Good, and Satisfactory; and three performance levels in each category: High, Medium, and Low.

1.3.2.1 Contingencies – Physical Fitness Assessment

To promote excellence in physical fitness, commanders are encouraged to recognize and reward sailors who make significant improvements or consistently score excellent or better on the PRT. Service members who do not meet satisfactory requirements in any PFA event (other than the sit-and-reach) fail the PRT. Service members who are unable to meet PFA standards or mission-related physical fitness standards required of their units may be subject to administrative action.

1.3.3 U.S. Navy Body Composition Assessment

The Body Composition Assessment (BCA) of the PFA consists of the weight-for-height screening and percent body fat assessment. This assessment is normally taken within 10 days of, but definitely not less than 48 hours prior to, the PRT. If a member exceeds the Navy's weight-for-height standards, then circumference measurements are taken to assess body composition. For males, the abdomen (navel level) and neck are measured; for females, the waist (natural indentation), neck, and hips, are measured. The maximum percent body fat is adjusted for age and gender. For males and females less than 40 years of age, the maximum percent body fat is 22% and 33% respectively. For males and females 40 years of age or older, the maximum percent body fat is 23% and 34% respectively (Appendix A, Table 6).

1.3.3.1 Contingencies – Body Composition Assessment

A service member who exceeds the weight-for-height and the percent body fat standards fails the BCA. This service member is monitored by an individualized FEP and is tested monthly on the BCA and the PRT to assess progress. At this point there are no required consequences other than reporting of PFA results that might make the service member ineligible for promotion, advancement, or re-enlistment.

Two BCA failures in four years are permissible; however, three or more failures result in significant administrative actions. The service member must adhere to the same requirements as in the first and

second failures and he or she also must pass three consecutive PFAs to qualify for re-designation, promotion, advancement, re-enlistment, and other actions.

Official documentation of the service member's body composition assessment and PRT results shall be made for each PFA failure. The documentation is used to formally notify the service member of the possible administrative consequences. For enlisted members, an Administrative Remarks page entry will be made for each failure (U.S. Department of the Navy, 1981). Copies will be included in the field service record and permanent personnel record. For officers, a Letter of Notification shall be written for each PFA failure and a copy will be forwarded to the Commander, Naval Personnel Command, only when (1) adverse action is recommended following the first or second PFA failure in four years or (2) it is the third failure in four years. Authority to deny or execute advancement, promotion, frocking, or re-designation is at the discretion of the commanders, Commanding Officers (CO) and Officers in Charge (OIC) except for service members who have failed three or more times in a four-year period.

1.3.4 U.S. Navy – Pregnancy/Postpartum

According to the Chief of Naval Operations Instruction (OPNAVINST) 6110.1F, service members are exempt from meeting PRT and body composition standards from the time of diagnosis of pregnancy until at least six months after childbirth or termination of pregnancy. With a physician's advice and with the assistance of a CFL, pregnant service members are to continue to participate in an ongoing exercise program unless they are waived by their Primary Care Manager.

1.3.5 U.S. Navy – PRIMS Database

In accordance with OPNAVINST 6110.1F, the Navy Personnel Command uses the Physical Readiness Information Management System (PRIMS) as a centralized database for PRT and BCA results. PRIMS is designed to automate the process of administering and maintaining the Physical Readiness Program. It is an electronic replacement for the long-used hardcopy "pink folders," which held PRT data on Naval personnel.

PRIMS is a menu-driven program with four main functions: to collect physical readiness data, to prepare collected data for submission to the Navy Personnel Command, to maintain a command-level database of the data collected, and to disseminate results to NAVPERSCOM. The current version of PRIMS, 1.0.11 – May 2001, can be networked or operated on a stand-alone personal computer. PRIMS is written in Visual FoxPro 6.0 using an Oracle database and is available via the internet, CD, or floppy disk. Users can receive help via the website link: (http://www.haprims.persnet.navy.mil/), email (prims@persnet.navy.mil), or the helpdesk (901-874-2229; DSN 882-2229/4257) (Physical Readiness Information Management System, 2002).

PRIMS provides a consistent means of collecting data, calculating scores, and assisting the CFL in tracking a member's Physical Readiness Cycle and PFA results. It provides the user the ability to view a wide variety of listings and print reports. The different reports available include member PRT results, command PRT summary, and member FEP/Practice PRT results. Each listing and report allow the user to choose different constraints to obtain the desired information.

CFLs and assistant CFLs enter data on each member in their command. The Physical Activity Risk Factor Questionnaire can now be completed within PRIMS, but all other PRT information is entered manually. Data are sent to the Navy Morale, Welfare and Recreation (MWR) Fitness Division via floppy disks within 30 days of a PRT. Unfortunately, only 20 percent of the Navy data are received by the MWR Fitness Division. This is due to continued use of the manual system (pink folders), floppy disk problems, and communication and marketing problems. The major communication and marketing

problem is that the users aren't notified when a new version of the PRIMS software is released. Installing the most current version of software usually alleviates user problems.

Even though PRIMS is a useful tool for tracking and analyzing PFA data, there are some aspects that users dislike. Navy MWR Fitness Division stated that the PRIMS system is too time-consuming, unreliable, not user friendly, and lacks quality control.

Goals for the Naval Personnel Command are to have a web-based application in the future to allow software upgrades, easier data collection, cost savings, and to reduce workload for the CFLs. Having PRIMS as a web-based application will allow connection with other databases for automated personnel data entry and sharing of data between databases. Training can also be made available through the web system. Video teleconferences can be held to train as many people as possible. A web-based system, as well as video teleconferencing, will additionally support training on a wider basis.

1.4 U.S. Air Force

1.4.1 U.S. Air Force Fitness Program

The Air Force Instruction (AFI) 40-501, *Air Force Fitness Program* (U.S. Department of the Air Force, 2000), directs that Air Force members must be physically fit to support the increasing and changing requirements of the Air Force mission. The goal of the program is to motivate all members to participate in a physical conditioning program that emphasizes total fitness to meet mission requirements and deliver a fit and healthy force and community.

The Air Force Fitness Program has three elements: (1) The individual – who is responsible to achieve and maintain a physically active lifestyle; (2) The commander, Unit Fitness Program Manager (UFPM), and member – who are responsible to ensure that the annual requirements are met to assess member fitness; and (3) The entire fitness team from wing commander to the member – who are responsible for the Air Force physical fitness improvement program.

The Air Force Fitness Program is supported at each installation by the Health and Wellness Center (HAWC) staff. HAWC support includes a health promotion manager, a Fitness Program Manager (FPM), and the fitness facilities. Each individual unit appoints a UFPM and fitness assessment monitors.

1.4.2 U.S. Air Force Physical Fitness Assessment

The Air Force Fitness Program states that cardiovascular (aerobic) fitness is the single best indicator of total physical fitness. To test a member's cardiovascular fitness, cycle ergometry is used due to its reliability and safety. This testing procedure evaluates the heart rate at the end of a 6-14 minute steady-state cycling period. The results are recorded as pass/fail and are determined by gender and age (Table 1).

Table 1. Minimum Cycle Ergometry VO$_2$ Score to Meet Air Force Fitness Standards

Age	Females	Males
Predicted Maximal Oxygen Uptake (ml/kg^{2}min)		
<24	27	35
25-29	27	34
30-34	27	32
35-39	26	31
40-44	26	30
45-49	25	29
50-54	24	28
55-59	22	27

The Physical Fitness Assessment (PFA) consists of several components: a weight and height examination, the cycle ergometry test, and the proposed addition of a push-up and abdominal crunch test, both of which remain in a trial period (Appendix A, Table 4). The member is allowed two minutes to perform as many push-ups as possible. The same amount of time is given for the abdominal crunch portion of the test with a three-minute rest break between exercises. In addition, the member's age and tobacco-use data are recorded after completing the fitness assessment. These data are collected on a 12-month cycle at each Air Force base and are automatically transmitted and updated by File Transfer Protocol (FTP) immediately, or at least weekly the data are transferred by the FPM to a central database located at Brooks AFB.

1.4.2.1 Contingencies – Physical Fitness Assessment

Service members who fail to meet the physical fitness standards are required to attend a fitness education class offered by the FPM to discuss how to initiate and maintain the Self-directed Fitness Improvement Program (SFIP). Once physical fitness standards are met, the member will be removed from the SFIP and assessed annually. Service members who fail to pass the physical fitness standards after the 6-month SFIP are enrolled in the Monitored Fitness Improvement Program (MFIP) and are required to receive additional consultation from the FPM. Members who fail to attend a mandatory fitness assessment or an education class or program may be subject to administrative action.

1.4.3 U.S. Air Force Weight and Body Fat Management Program

In accordance with AFI 40-502, *Air Force Weight and Body Fat Management Program* (U.S. Department of the Air Force, 2002), all Air Force personnel are required to have an annual weight-for-height assessment the same month as they have their cycle ergometry test and PFA. If a member exceeds the Air Force maximum weight-for-height, a body circumference taping is required. The circumference measurement sites are neck and abdomen (navel level) for men, and the neck, waist (natural indentation), and buttocks (hips) for women. The circumference measurements are taken and percent body fat is calculated from body composition equations. The maximum percent body fat is adjusted for age and gender. For males and females less than 30 years of age, the maximum percent body fat is 20% and 28% respectively. For males and females 30 years of age or older, the maximum percent body fat is 24% and 32% respectively (Appendix A, Table 6).

1.4.3.1 Contingencies – Weight and Body Fat Management Program

If percent body fat standards are exceeded, the service member is referred for a medical evaluation to check for any medical conditions. If no underlying medical condition exists, the member is required to enter Weight Status Code (WSC) 0, a 90-day Exercise and Dietary Period (Table 2). The goal at this phase is to attain education for behavioral change in exercise and diet habits. If standards are met after this 90-day period, the service member is moved into WSC 3 (Phase II), or the Observation Period of the Weight and Body Fat Management Program (WBFMP), where progress is monitored (probation-like) monthly for six months. Meeting standards for six consecutive months warrants removal from the program. If standards are still exceeded after the 90-day period, the service member is entered into WSC 6 (Phase I), or the Initial Entry Period of the WBFMP, until the member meets the body fat standard.

Table 2. Air Force Weight Status Codes (WSC)

Code	Action
WSC 0	3-month Exercise and Dietary Period
WSC 1	Satisfactory Progress (Phase I)
WSC 2	Unsatisfactory Progress (Phase I)
WSC 3	6-month Observation Period (Phase II)
WSC 4	Body Fat Standard Adjustment
WSC 5	Temporary Medical Deferral Phase (Phase I)
WSC 6	Initial Entry Phase (Phase I)

Various military administrative actions apply at this stage depending on whether the member's progress is satisfactory or unsatisfactory. This may include restrictions on assignments, promotion actions, and possible discharge from the service. Progress is considered satisfactory when the member reduces one percent body fat or loses three pounds (female) or five pounds (male) per month.

1.4.4 U.S. Air Force Pregnancy/Postpartum

According to AFI 40-502, Paragraph 17.1.4, unit commanders may approve a temporary medical deferral for pregnant members when recommended by the Medical Treatment Facility Weight and Body Fat Management Program representative. During Phase I, the deferral expires six months after the pregnancy ends, regardless of how it ends. Based on the medical practitioner's recommendation, the unit commander may approve up to 18 months of deferral for pregnancy. For Phase II participants, medical deferrals for pregnancy expire six months after the pregnancy ends, regardless of how it ends.

1.4.5 U.S. Air Force FitManagement Database

The Air Force Fitness Program database is managed using the FitSoft and FitManagement software. FitSoft is the software used to collect the aerobic and muscular fitness assessment results at the HAWCs while FitManagement is used in conjunction with FitSoft to extract the data. In addition, FitManagement allows the FPMs to manipulate data and compile reports. The Air Force utilizes a bi-directional data flow between the HAWCs and Air Force Personnel Center (AFPC) which provides a constant flow of information (Figure 3). The AFPC feeds demographic data to the Office for Prevention and Health Services Assessment (OPHSA) at Brooks AFB, which then feeds the data to the HAWCs and into the testing facilities. In turn, the FPM sends fitness data, no less than weekly, back to OPHSA, which transmits the data back to AFPC.
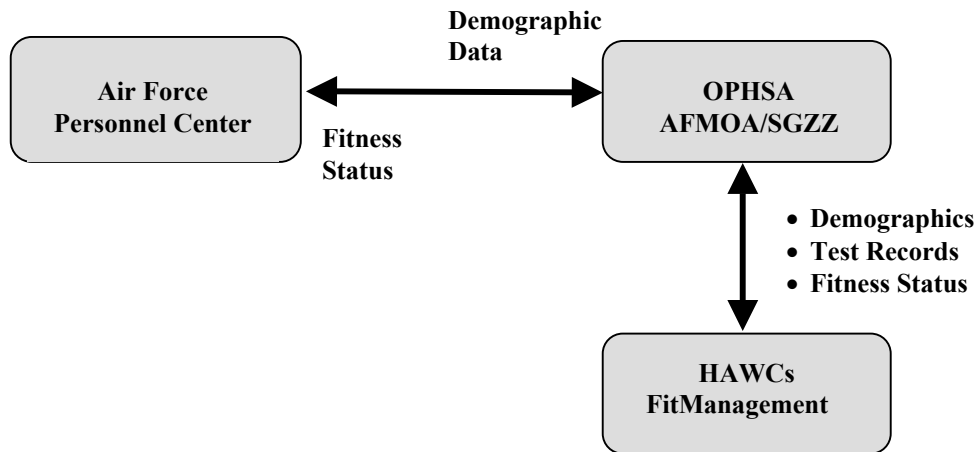
Figure 3. Air Force bi-directional fitness data flow

There is also a new function that allows records to be pulled from a central database at OPHSA. In the past, all records were kept locally at the various Air Force bases which made obtaining information on newly transferred personnel difficult. The new function allows the user to easily retrieve prior test scores and history so that when a service member is relocated to another base, the fitness data are transmitted and awaiting his or her arrival.

FitManagement provides the FPM the ability to customize the database. Options include deciding where the data are stored (e.g., individual hard drive or Local Area Network) and how the information is transmitted (computer disk or FTP). In addition, the FPM has the option of selecting categories and breaking the data into smaller, more manageable units. Finally, data can be exported and queries can be run independently of the original database.

Individuals who have internet access to websites with ".mil" extensions can obtain the data on the Air Force Corporate Health Information Processing System (AFCHIPS) website, https://www.afchips.brooks.af.mil, and the P2R2 website, https://p2r2.hq.af.mil (AFCHIPS, 2002). The Air Force Surgeon General reviews information on the P2R2 web site monthly and provides quarterly briefs to the Air Force Chief of Staff.

1.5 U.S. Marine Corps

1.5.1 U.S. Marine Corps Physical Conditioning Program

Physical fitness is an essential element to the combat readiness of the U.S. Marine Corps. Marines that are not in top physical condition are considered a detriment to the readiness and combat efficiency of their unit. Every Marine Corps member, regardless of age, gender, grade, or duty assignment is expected to engage in a Physical Conditioning Program (PCP). As outlined in Marine Corps Order (MCO) 6100.3J, *Physical Fitness* (U.S. Department of the Navy, 1988), each Marine is required to participate in a minimum of three hours of physical fitness training per week, to be tested semi-annually, and obtain a minimum level of third class on the Physical Fitness Test (PFT).

The objectives of the PCP are to contribute to the health and well-being of the service members through consistent exercise, to ensure that the service members are physically capable of performing their duties, to enhance their chances of winning in a combat situation, and finally, to boost self-confidence which in

turn enhances overall discipline and morale. It is the unit commander's duty to maintain the PCP and conduct the required PFT.

1.5.2 U.S. Marine Corps Physical Fitness Test

The Marine Corps PFT is governed by MCO 6100.3J. The PFT is administered semi-annually to Marines of all ages. Prior to 1997, service members over the age of 46 years were exempt from the test. Recently the test was revised to close the gap on gender disparities in the standards and change the scoring method from "pass/fail" to a point score method. The maximum score is 300 points, 100 points on each of the three components of the PFT. The three components of the test are a three-mile run, abdominal crunches (two-minute limit), dead-hang pull-ups for the men (as many as possible), and a flexed-arm hang for the women (maintained as long as possible).

The PFT has recently been revised in several other areas. For Marines assigned to locations at or above 4,500 feet above mean sea level, an "altitude compensation" has been applied to the three-mile run. Each age category for both genders is permitted an additional one-and-a half minutes to achieve the minimum acceptable performance. The sit-up requirement has also been modified to provide an enhanced evaluation of abdominal strength and reduce the potential for lower back injuries. Rather than performing the sit-up with the hands secured behind the head, the sit-up is now executed with the knees flexed, feet level on the deck, and the arms folded across the chest.

1.5.2.1 Contingencies – Physical Fitness Test

Failure to meet the minimum requirements in any event of the PFT constitutes failure of the entire test regardless of the total number of points earned (Appendix A, Table 4). If a Marine fails the PFT, a warning letter will be sent through the chain of command. This letter states that failure of the Marine to improve on the PFT may result in denial of re-enlistment or promotion. This letter then becomes part of the Marine's official military personnel file.

1.5.3 U.S. Marine Corps Body Composition Program

The body composition assessment, governed by MCO 6100.10B, *Weight Control and Military Appearance* (U.S. Department of the Navy, 1993)*,* is performed semi-annually in conjunction with the PFT. The program consists of a dual screening process in which the service member's weight is compared to the appropriate weight-to-height table. If the service member exceeds the maximum allowable weight, then circumference measurements are taken to obtain his or her body fat percentage. For males, height, the abdomen (navel level) and neck are measured; for females, height, the waist (natural indentation), neck, and hips are measured. The maximum percent body fat for males and females is 18% and 26% respectively (Appendix A, Table 6). In addition, each service member must present an acceptable military appearance. Marines exceeding both the maximum body weight and percent body fat standards will be assigned to the Weight Control Program.

1.5.3.1 Contingencies – Body Composition Program

If a Marine fails the weight management/body composition portion of the PFT, he or she is referred to an Appropriately Credentialed Health Care Provider (ACHCP) for examination. If the individual's condition is due to an underlying or associated disease process, one of the following actions will take place: the individual will either (1) receive treatment to alleviate the condition and return to the unit or (2) be hospitalized for obesity treatment at an Alcohol Rehabilitation Center (ARC). Upon completion of an obesity rehabilitation program, the Marine will remain in a command-directed physical conditioning program for a maximum of 12 months or until weight standards have been achieved. If, after having been

removed from the weight control program, the Marine's adverse weight condition reappears, that individual will be provided one 90-day period to conform to U.S. Marine Corps weight standards. If goals are not met after 90 days, discharge processing is required.

If the ACHCP discovers no underlying or associated disease process as the cause of the service member's condition, a weight loss and/or exercise program is recommended (MCO 6100.10B, 1993).

1.5.4 U.S. Marine Corps – Pregnancy/Postpartum

According to MCO 6100.10B, females who become pregnant while assigned to the weight control program will remain on the program in an inactive status. Once they are authorized to return to full duty, they will resume active participation in the program. Females in a postpartum status are required to meet weight or percent body fat standards within six months of authorization to return to full duty. Training for the test is encouraged to begin immediately following the six-week convalescence leave period.

1.5.5 U.S. Marines Corps– Database

The Marine Corps does not maintain a database exclusively for physical fitness or weight management test scores. They do, however, use the Total Force Data Warehouse (TFDW) to archive and maintain physical fitness data on service members for 12 years (Polach and Young, n.d.). PFT data are entered semi-annually for active duty and annually for reserves. The PFT results (pass/fail, classification, and score) are noted on performance reports and evaluations. This information is contained in a master database, but only the total score is included. Data regarding individual event performance on the PFT are kept locally by the parent company. Once the score is entered, the categories are automatically calculated and the overall score is then calculated. A set of decision-support tools within TFDW support strategic decisions made about accessions, training, promotions, and retention.

In addition, there is no database that stores individual anthropometric data or body composition results. Like the individual PFT event data, the height and weight for service members are collected semi-annually and kept locally by parent commands.

2. RELEVANT EXISTING DATABASES

This section presents a sample of existing military and civilian databases, some of which integrate several database systems into one comprehensive database for the purpose of tracking personnel and health care data. Any future central military services physical fitness and weight management database must be fully coordinated with existing DoD personnel, medical, and health monitoring databases. This will allow researchers to analyze and document relationships between fitness status and other factors such as injury rate, job performance, and combat readiness. Please see Appendix B for a more detailed list of existing databases.

2.1 Military Databases

2.1.1 Composite Health Care System II (CHCSII)

The Composite Health Care System II (CHCSII) was designed to provide the DoD with an Automated Information System (AIS) for the clinical business area of the military health system. Several of the applications and systems utilized by CHCSII include the Composite Health Care System, Ambulatory Data Systems, Corporate Executive Information Systems, the Defense Dental Standard Application, the Personal Information Carrier, and the Preventive Health Care Application (Office of the Assistant Secretary of Defense [Health Affairs], 2000). CHCSII integrates data from all of these systems to create a Computer-based Patient Record (CPR) for each military health system beneficiary. The CPR is a record that ensures comprehensive, patient-centered information over the beneficiaries' life.

The CHCSII system is a multi-tiered, open system architecture based on a client/server model that addresses the health-care information system needs of the Military Health System (Office of the Assistant Secretary of Defense [Health Affairs], 2001). CHCSII utilizes commercially and government-developed software, uses standard data elements provided by the National Institute of Standards and Technology (NIST), and is linked to the Defense Enrollment Eligibility Reporting Systems. One of the key features of the CHCSII is its standardization of data items. Data standardization is accomplished through the use of an approved clinical lexicon of terminology, or other mechanisms for standard terminology, and in accordance with the DoD Standard Data Dictionary (Office of the Assistant Secretary of Defense [Health Affairs], 1999). Through improved collection, storage, integration, management, and communication of patient and clinical information, the CHCSII will improve force readiness and military health care.

2.1.2 Recruit Assessment Program (RAP)

The Recruit Assessment Program (RAP) is a proposed DoD program for the collection of baseline demographic, medical, psychosocial, occupational, and health-risk factor data from all U.S. military personnel at entry into the armed forces (Hyams, n.d.). The impetus for establishing RAP developed from health questions that arose after the Gulf War. Many service members came back in reasonably good health; however, after a few months many of them developed unexplained illnesses and physical symptoms. It was obvious that the DoD lacked baseline health data for service members before they entered the war. It is believed that if information on the health of the service members prior to entering the Gulf War had been available, this could have helped in understanding the unexplained symptoms.

RAP will collect comprehensive data on the service member at initial military training. These data will serve as the first module of a longitudinal database that will maintain health and fitness data on military personnel throughout their military career. At the end of military service, the data will be transmitted to the Department of Veterans Affairs (VA). RAP will provide DoD and VA physicians with accessible medical and risk-factor data to aid in clinical diagnosis and care, to develop improved preventive medicine strategies using health data collected at entry into military service, and to be used as baseline

data in future longitudinal research studies. It is anticipated that RAP will be linked to pre- and post-deployment databases, hospitalization records, outpatient records, and the Health Enrollment Assessment Review (HEAR), which is the TRICARE health assessment survey instrument.

The RAP questionnaire will be administered on an electronically scannable paper-and-pencil form to all recruits within the first three to seven days of basic training. This form should be compatible with the Standard Forms 93 and 98, and other questionnaires completed upon entry into military service. The plan is to add a concise RAP data report to the service member's medical folder while the actual questionnaire will be in a computerized database. The forerunner of RAP is the Ship-Sailors Health Inventory Project which demonstrated that it is feasible to administer a scannable questionnaire to large numbers of recruits. That project was conducted at the Navy Hospital in Great Lakes, IL.

The RAP program proposal has been extensively reviewed. The Presidential Review Directive-5 (1998) and the Institute of Medicine (1999) both state that the DoD should develop and maintain an electronic health- and risk-factor baseline information system. Pilot testing has been completed on the questionnaire and hardware with further testing currently being done at the Marine Corps Recruit Depot in San Diego, CA, and Parris Island, SC, as well as the Army Basic Combat Training Command at Ft. Jackson, SC.

2.1.3 Total Army Injury and Health Outcomes Database (TAIHOD)

Injuries have a great impact on the readiness of the armed forces. To track injuries and their effects, the U.S. Army Research Institute of Environmental Medicine (USARIEM) created the Total Army Injury and Health Outcomes Database (TAIHOD). The database contains four general categories of data: demographics and occupational history, health outcomes, health habits, and chemical exposures. The Defense Manpower Data Center (DMDC) Personnel dataset, which includes millions of soldier records, is the core of the TAIHOD. Figure 4 illustrates the principal components of the TAIHOD.

USARIEM researchers use the TAIHOD to link Army personnel records, self-reported health habits, and various exposures to specific health outcomes ranging from death to outpatient encounters. In addition, the TAIHOD is used to trace the interrelationship of these outcomes and exposures over time (Amoroso, Yore, Weyandt, & Jones, 1999). The TAIHOD provides researchers with the ability to analyze a broad range of data from multiple sources (spanning 1971 to present) to improve the efficiency of surveillance and research programs, improve data quality, and help determine where to focus injury and illness prevention resources.
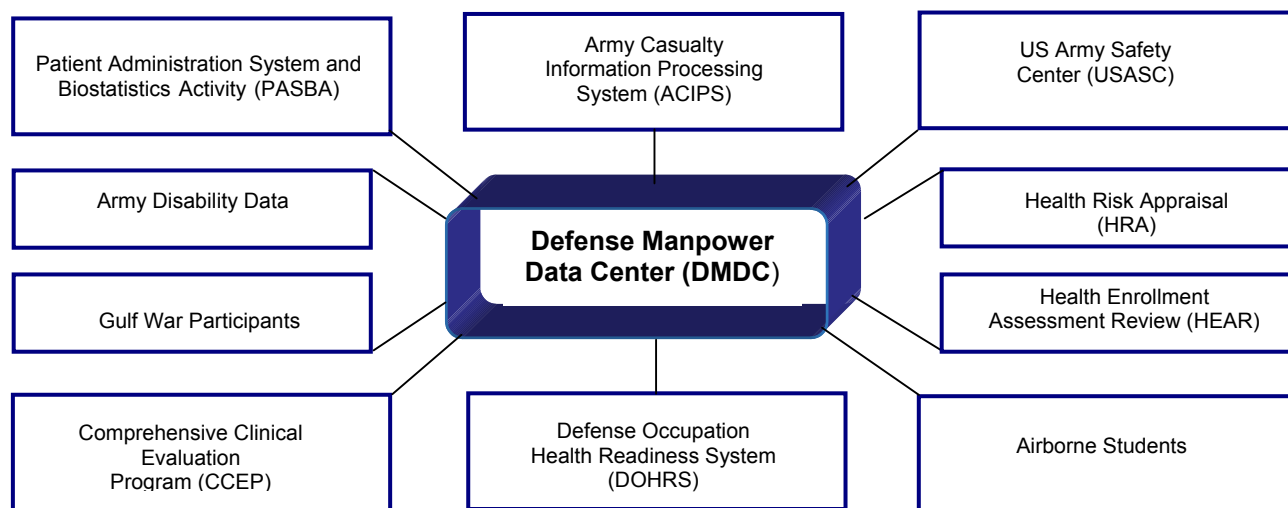

Figure 4. Overview of datasets included in the Total Army Injury and Health Outcomes Database

All records in the database are linked by subject IDs derived from Social Security Numbers (SSN), which are removed to protect the anonymity of the soldier. Access to the TAIHOD is controlled through a secure intranet (i.e., no access to the internet). All analytic efforts and database inquiries require review and approval, and are subject to restrictions on data use as defined by Institutional Review Board/Human Use Review Committee (IRB/HURC) protocols. All researchers using the database are required to sign confidentiality agreements and only summary data are published.

The TAIHOD has several components of particular interest to the study of weight management issues. Individuals seen in an inpatient or outpatient setting for eating disorders, or discharged from service for being overweight, can be identified. Self-reported heights and weights are available on over 500,000 Health Risk Appraisal takers from the 1990s. In addition, induction heights and weights are available on most enlisted soldiers (from Military Entrance Processing Station [MEPS] data), and heights and weights of all personnel on active duty were obtained in early 2000. These datasets can be linked to study longitudinal changes over time as well as to study the relationships between various health outcomes and height, weight, or body mass index.

2.1.4 Defense Enrollment Eligibility Reporting System (DEERS)

The Defense Enrollment Eligibility Reporting System (DEERS) was established by the DoD under Congressional mandate to improve the control and distribution of available military health care services. The database acts as a central warehouse to store a variety of records on all service members who are entitled to Uniformed Services benefits. Currently, DEERS is the central source for personnel, manpower, training, and financial data from the DoD personnel community and contains information such as:

- general demographic data
- eligibility and enrollment information
- "Non-Availability Statement" information (e.g., blood type and organ donor patient data)
- catastrophic cap and deductible amount details
- enrollment fee payment details
- enrollment fee waiver information
- primary care manager details
- residence mailing address
- telephone number

DEERS is connected to a variety of military health, data collection, maintenance, and reporting systems. Examples of such systems include the Automated Central Tumor Registry, Reportable Diseases Data Base, and the Immunization Tracking System. DEERS is also linked to systems that are used by authorized administrators of the military health community. Examples of these systems include the Managed Care Support Contractors/Claims Processors, the National Mail Order Pharmacy program contractors, Continued Health Care Benefit Program (CHCBP) administrators, and Federal Employee Health Benefit Plan administrators.

The information contained in DEERS is used to improve the control and distribution of available military health care services, improve the projection and allocation of costs for existing and future health care programs, and to minimize the fraudulent use of military health benefits by unauthorized persons (U.S. Department of Defense, 1982). DEERS is currently maintained and administered by the DMDC.

2.1.5 Millennium Cohort Study

The Millennium Cohort Study (MCS) is a research project sponsored by the DoD that will follow approximately 140,000 U.S. military personnel during and after their military service for up to 21 years. The goal of the MCS is to evaluate the health risks of military deployment, military occupations, and general military service. Service members selected to take part in the study were randomly chosen from DoD databases to represent each service branch, service type, military occupation, gender, and age group. A questionnaire will be sent to the same participants every three years to collect data. Information gathered in the MCS will help define future military health care and benefits policies for the DoD and Department of Veterans Affairs (U.S. Department of Defense Center for Deployment Health: MCS, About the Study, n.d.).

There are two incentives behind the MCS. The first comes from the DoD which identified the need for research to determine whether deployment-related exposures are associated with post-deployment health outcomes. The second incentive comes from the Institute of Medicine report, *Gulf War Veterans: Measuring Health* (1999), which recommended that the DoD begin to collect population-based data to evaluate the health of military service personnel during and after their military career.

The questionnaire uses items from widely used standardized survey instruments which include the SF-36V Health Survey, the Patient Health Questionnaire (PHQ), and the National Health Survey of Persian Gulf War Era Veteran (U.S. Department of Defense Center for Deployment Health: MCS, How was the Questionnaire Created, n.d.). Additional data collected in the questionnaire includes information related to the service member, physical and mental health, and possible traumatic life events or experiences of military service. The MCS data are kept in locked files. When the data are entered into the computer for analysis, answers will be identified by a special identification number known only to the participant and the research team members. Personal information, such as SSN, is removed from the questionnaire and data file upon return to the researchers.

2.2 Civilian Databases

2.2.1 National Health and Nutrition Examination Survey (NHANES)

The National Center for Health Statistics (NCHS), one of the Centers for Disease Control and Prevention (CDC), has been conducting a series of cross-sectional health examination surveys on civilian health and nutrition for 40 years in the National Health and Nutrition Examination Survey (NHANES) program. The current NHANES survey began in 1999 and is planned to be in the field continuously. The goals of NHANES are to (1) estimate the prevalence and distribution of health conditions and related factors in the population, (2) describe awareness, treatment, and control of selected diseases, and (3) monitor trends in health, risk behaviors, and environmental exposures over time (U.S. Department of Health and Human Services, n.d.).

Subjects for this survey are selected from the census tract, making eligible the residents of all states and the District of Columbia. If an individual in a selected household is of a pre-specified gender and age, he or she is selected to be included in the survey. The survey process begins with an extensive interview in the home, then subjects report to the NHANES Mobile Examination Center for an examination (ill or elderly subjects may receive a home examination), and finally they are contacted for a longitudinal follow-up. The household interview includes questions on health conditions, health care coverage, environmental and occupational exposures, health behaviors, and nutrition and dietary supplements.

Participants are given minor incentives including compensation for transportation, fasting, and reporting to the correct session. The Mobile Examination Center is a standardized environment run by technicians

who are trained and travel with the survey. No local agencies are used to conduct the survey or examination. The NHANES survey visits 15 sites per year and stays in one location for four to six weeks. Approximately 300-400 people are examined during each period.

The data are electronically transmitted to a field contractor's home office and combined in a database. Data are then transmitted back to NCHS within 24 hours. NCHS employs strict data standards and a data dictionary as well as complete systems integration with all offices using the same system platform. NCHS also complies with the CDC security and criticality requirements. Virtually all the data are released to the public after an extensive quality assurance protocol during data collection and quality control after data collection. Further information or data downloads can be obtained at http://www.cdc.gov/nchs/nhanes.htm.

2.2.2 The Fels Longitudinal Study

The Fels Longitudinal Study began in 1929 to study human growth and to track growth changes over time. The first participants were enrolled in 1929 by their parents before they were born. Beginning at birth, the participants were measured systematically at intervals of 1, 3, 6, 9, and 12 months and then every 6 months thereafter until 18 years of age. Examinations occur biannually at this point. As of June 30, 2001, there are 1,500 participants in the Fels Longitudinal Study who are living and active. The oldest participant in 2001 was 72 years of age (Wright State School of Medicine, n.d.).

When the Fels Study began in1929, data collection included anthropometry and blood pressure. Beginning in 1976, body composition, fasting plasma lipids and lipoproteins, and lifestyle variables, such as cigarette smoking and physical activity, as well as family health history were included in the study. Inter- and intra-measurer reliability data have been collected over the years. Reliability in the Fels Study is excellent, with reliability coefficients for most of the variables well above 90%. Fels data are unique in their long-term serial nature extending from birth to old age.

The database management systems for the Fels Longitudinal Study include 4th Dimension (4D), dBase IV, and SAS. The 4D and dBase IV serve as transitional databases for data entry while SAS serves as a master database. All the data in the transitional databases are checked and edited before being merged into a master database. 4D is a multi-user relational database application that allows database operations to be performed by several users simultaneously. Each user connects to a database located on a server from his or her own workstation. The SAS system consists of a language to manage data and procedures for data analysis and reporting. The statistical results from the SAS system are widely known and accepted. At regular time intervals, the information in the transition database is exported. Custom export procedures are used to export the examination data to ASCII files that are read by the SAS quality control program. The export procedure only selects values that have been verified. After the examination visit, the data are exported and the records are marked. If a record is modified for any reason after it is exported, the exported mark is removed and it will automatically be included in the next export.

2.3 Civilian Research

2.3.1 Pennington Biomedical Research Center

Pennington Biomedical Research Center is a division of Louisiana State University. The center, whose mission is nutrition, research, and education, consists of four divisions: (1) Obesity, (2) Health and Performance Enhancement, (3) Nutritional and Chronic Disease, and (4) Functional Foods. Funding for the center comes from a variety of sources including the National Institutes of Health (NIH), U.S. Department of Agriculture (USDA), the DoD, and state and private funds.

The center has a 13-year history of collaboration with the Army providing support in the areas of energy expenditure and nutritional studies. The center's work has resulted in a better understanding of war-fighter needs in terms of water and energy for different tasks. A new five-year grant recently awarded to Pennington focuses on the issues of obesity and body-weight regulations for the military with emphasis on how they relate to recruit readiness. The results of this study will enable the researchers to investigate how stress relates to the regulation of energy balance and the interactive effects of diet composition on physical performance.

Pennington has developed a program referred to as "Look Ahead." This is an 11 ½-year study of the effects of weight loss on cardiovascular disease and end points in diabetic patients. The purpose of this study is to demonstrate the advantages of weight loss. The diabetic population has been chosen as its focus since it is a prevalent disease with a growing population in the United States. In a previous study, Pennington demonstrated that weight loss prevents the development of diabetes. The Look Ahead study hopes to demonstrate that weight loss can actually prevent cardiovascular deaths as well as heart attacks and strokes.

Pennington has extensive scientific expertise in obesity and experience in weight control. A project is being developed at Fort Bragg, NC to develop a cost-effective weight management program that will help overweight service members meet and maintain standards. The plan is to utilize a population-based web-based intervention with both treatment and preventive components.

3. WORKSHOP FINDINGS

3.1 Workshop Rationale

The impetus behind this workshop was derived from issues and questions resulting from the proposed changes to the DoDI 1308.3. It is anticipated that this instruction, which has been under revision since 1999 and is expected to be released in 2002, will require all services to collect physical fitness and body fat data that indicate how well service members are meeting individual service standards of physical readiness. The primary question addressed during the workshop was how the military services will accomplish this task.

The Military Services Physical Fitness and Weight Management Database Workshop was the initial step toward conceptualizing a military services physical fitness and weight management database. By gathering together representatives of policy issues and database development from each service, as well as representatives from other DoD agencies, the intention was to review the current status of the programs for each service and be poised for action with a plan for such a database, if there is consensus with the services. While no decisions were made on specific aspects of such a database, the groundwork was laid for options and possible solutions.

3.2 Workshop Goals

The goals for this workshop were as follows:

- To discuss the need and benefit of the establishment of a centralized database for military services physical fitness and weight management
- To gather information in regard to the current status of the military physical fitness and weight management programs and related data in each service branch
- To determine the essential and desirable components of a centralized database
- To discuss the advantage of a centralized military database as it relates to health and deployment

The key issues for this centralized database are (1) to determine which data elements need to be collected for monitoring physical fitness programs and (2) to plan statistical analysis of these data that may benefit the services, such as detecting associations between training and injuries that may lead to improvements that save money and reduce lost duty time.

A critical issue with the concept of developing and maintaining this type of database is streamlining the process so that it will be a "real-time" system. Certain data elements from this database must be retrievable at any given time, so it is important to determine exactly which elements are most critical for monitoring. It must be determined which data elements are absolutely necessary from a reporting standpoint and which data elements are desired from a researcher's standpoint. Delays of a year or even several months will not be acceptable for meeting the DoD mandates that are expected.

Additional topics include potential data storage and data-sharing protocols to document lessons learned from past database creation, merging, and mining efforts.

3.3 Database Issues and Discussion

Issue 1. Why is it important to establish a centralized database for housing the military services' physical fitness and weight management data?

- The services are to answer DoDI queries and address their own current body composition and fitness issues that necessitate the establishment of databases. These databases should be combined for DoD reporting requirements and have the availability of linking to injury and epidemiology databases to allow documentation of important relationships between fitness status and injury rates, the number of sick days, job performance, and combat readiness. The combined databases would allow the DoD to perform analyses that would allow feedback at the level of the service member on his or her fitness status relative to some appropriate service unit.

Issue 2. What essential data elements are to be included in the database? What data elements might eventually be included?

- These should include gender, age, rank/grade, a component for those who failed the fitness test, those who failed the percent body fat standard, those in remedial training, and those placed in a service-directed weight-control program.
- The fitness test scores should be coded appropriately to individual service testing methods other than just a pass/fail indicator.
- Occupational specialty and injury incidents would be important elements in the database, and if practical, future links to medical and personnel databases would allow analysis of relationships among levels of fitness, injury rate, and occupational specialty. Having access between databases that house personnel, occupational, and medical records would determine whether certain vital relationships exist. For instance, do those who are more fit have a lower rate of injury and sick days?

Issue 3. Who would use such a database and for what purposes?

- The individual services and DoD researchers can use the database to conduct data analysis to improve safety and effectiveness of fitness programs. The database can provide information to determine if there is any relationship between a service member's level of fitness and weight and his or her job performance, injury rate, cognitive readiness, and illness record.
- The database will be vital to provide statistics for consistent, timely, and accurate reporting to meet the anticipated DoDI mandated requirements, for example, analysis of fitness and weight program effectiveness and readiness trends for the DoD.

Issue 4. What is the status of current databases within each military service?

- The Army does not have a physical fitness or weight management database.
- The Navy's current database system is the Physical Readiness Information Management System (PRIMS).
- The Air Force's program uses bi-directional data flow, from the central personnel computer system through the Air Force medical records system, to the local fitness installations where FitSoft and FitManagement programs are used.
- The Marine Corps does not have a database exclusively for physical fitness or weight management data. Overall fitness scores are entered into the Total Force Data Warehouse, a personnel database, but individual event scores are not stored electronically.

Issue 5. For the existing data systems, how frequently data are entered and reports generated?

Table 3. Frequency of Fitness Testing Across Services

Per 12 months	Physical Fitness	Weight Screen
U.S. Army	2X	2X
U.S. Navy	2X	2X
U.S. Air Force	1X	1X
U.S. Marine Corps	2X	2X

- The Army PFT and weight testing occur twice a year for active duty personnel, and once a year for reservists. There is no systematic requirement for reports. Reports are generated when a request is made.
- The Navy's weight and physical fitness tests are administered twice a year. PFA results are generated by PRIMS and sent to NAVPERSCOM within 30 days of the assessment.
- The Air Force weight screen and physical fitness test are administered once a year and reports are generated monthly.
- The Marine Corps administers the physical fitness test twice a year for active duty personnel, and once a year for reservists. Reports are generated only for those on a special fitness-weight program.

Issue 6. What analyses and statistics are used to develop reports on health, fitness, performance, readiness, and deployment and to whom the reports are distributed?

- Statistical analyses for the Army are performed only when specifically requested and through field sampling.
- There are no required analyses or systematic reporting performed with the Navy fitness data.
- The Air Force calculates trends daily and summarizes data monthly. Monthly reports are generated centrally for the unit, wing, and Major Air Command (MAJCOM).
- Statistical analysis for the Marine Corps is performed only on an as-needed basis.

Issue 7. What issues are related to security, data quality control, and experience with the use of current databases in each military service?

- The Army's PFT information is maintained on paper scorecards. The company clerk at the unit level is in charge of maintaining these records.
- Currently only four people have access to the Navy's PRIMS database. Only these four people can query, change, or correct the data.
- All systems within the Air Force (local and central databases) are certified and password-protected. The systems are networked with a back-up system.
- The Marine Corps has a licensed agreement to handle the security with their Total Force Data Warehouse database. Only certain experienced personnel can handle the program and have it installed on a local computer.

Issue 8. What procedures do the military services use to gather data in a consistent and timely manner?

- Data are gathered at varying times across the Army, as needed.
- The Navy collects data in real time and analyzes it biannually.

- The Air Force issues monthly reports on the 5th of each month, with results posted to the PRP2 website the following month. The Air Force Surgeon General reviews these reports on the web each month and briefs the results to the Air Force Chief of Staff quarterly.
- For the Marine Corps, data collection requires a data call.

Issue 9. What level of detail should be included in the database (actual PF scores, pass/fail information)?

- More detailed information will be needed for a comprehensive annual summary. For instance, actual scores on the events will provide a more robust summary than merely pass/fail data. However, care needs to be taken to not overload the system. More data will require more storage space that will slow down analysis, particularly web-based systems. It was suggested, rather than keeping pass/fail as a field, that the database should have a calculated field and a query capability.
- In addition to the data currently collected, participants indicated a desire to include demographic data, pre-existing injuries, previous physical activity levels, anthropometric measurements, and a comments field. The method in which the exercises are performed may change, so it would be important to document the protocol. For instance, are the sit-ups performed with the hands locked behind the head or with the arms placed across the chest?

Issue 10. How frequently should the data be entered and reports generated?

- This should be done at least annually, but discussion arose concerning the issue of biannual testing. If the service requires two exams per year, how will the data be handled? Will the scores be averaged for each individual or will only the most recent score be included in the report?
- All data collected by the services will not necessarily be included in the DoD report. Data within each service could be transferred to the central database on a monthly basis.

Issue 11. How should quality control be conducted?

- Information in the database is sensitive and may affect a service member's career. Quality Assurance (QA) and Quality Control (QC) are critical. The database should include a consistent check and logic check along with a secure entry procedure and "write-only" protection. If a numerical value is entered into a categorical variable, the user will be alerted. The same applies if the user enters a value that is out of range for that particular variable.
- Additionally, QA and QC should be done within each individual service's database. This process should include standardized measuring techniques, standardized and calibrated equipment, and periodic training and monitoring of measurers.

Issue 12. What type of security measures should be implemented on the database?

- The Navy anticipates using Personal Key Infrastructure (PKI) in the future. Currently, only the Command Fitness Leaders (CFL) have the authority to access the database via an email address with a ".mil" extension.
- It is crucial in the early development phase to know what the Bureau of Medicine and Surgery (BUMEDS), Human Subject Review Board (HSRB), and equivalent authorities require for confidentiality. This may include issues such as the type of information a person needs to query the database, ensuring that information shared is within the human subject protection laws, and that the services are compliant with guidelines of security and confidentiality.
- Identifiers need to be established and kept in a separate file with limited access. If data need to be transferred, the identifier file is always transferred separately.

Issue 13. Where should the data be housed? At a central location?

- Workshop participants generally agreed that an impartial organization should develop and maintain the database and generate the reports for the Office of the Secretary of Defense (OSD). This organization would need to have extensive experience in longitudinal databases and expertise in data analysis and interpretation. Housing the data in a central location would be advantageous for the people seeking information and answers. Instead of contacting four separate organizations for information, only one organization would need to be contacted.

Issue 14. How will the database be used to support the health, physical fitness, and performance goals of each military service and provide data on deployable combat readiness?

- Data on pass/failure of fitness and weight status can be used to assess individual and unit combat-readiness.
- The success of remedial programs can be evaluated based on the number of individuals whose fitness and weight scores improve.
- The effects of modifications to fitness and weight standards, and fitness and weight training programs, can be evaluated.
- The relationship between fitness and rates of injury can be used to substantiate recommendations for increased levels of fitness.
- The relationship between occupational focus and rates of injury can be used to prescribe specific fitness programs and standards for those in physically demanding specialties.
- Data linkages to other systems that focus on personal health habits can illustrate the effects of lifestyle choices on levels of fitness and weight.
- Wellness initiatives can be designed on the basis of relationships between lifestyle choices and levels of fitness and weight.

Issue 15. What analysis and statistics can be used to provide information on health and readiness?

- Overall reporting to federal agencies will depend on the upcoming DoDI. Certain to be of interest will be overall fitness test pass/fail rates and percentages of military personnel who meet weight-for-height standards. These data will be required by the individual services for federal reporting. A more focused breakdown of these statistics will help commanders of the services assess combat readiness and make decisions about program effectiveness.

Issue 16. What type of control will be needed to ensure the security and access concerns regarding information in the database? How will access to the database be determined and controlled?

- No definite decision has been made regarding the location of any centralized database. A central administrative agency would provide objective data and analysis.
- Queries for information regarding each service's data would be referred to the Database Center from federal agencies or the services themselves, with a formalized approval process yet to be established. Analyses should be performed by a qualified staff of biostatisticians.

Issue 17. What are the steps necessary to promote consensus among the military services to partake in the planning and development of a centralized physical fitness and weight management database?

- A standing committee, such as the group that participated in the current workshop, could continue to meet as this project progresses. A suggested first topic would concern more specific lessons learned in the development of existing, relevant databases, such as the TAIHOD and the Navy's Air Force's systems of acquiring and managing fitness program data.
- The centralized database system should allow flexibility to accommodate each service's needs while maintaining consistency across the services for the DoD. A survey of users' needs and an outline of the database from each service would be useful to ensure that the centralized database will be relevant and helpful.

Issue 18. What type of database feedback mechanism will be implemented?

- At the level of the individual, a personal handheld computer could suggest remedial programs if an individual's performance was below some specified level on a fitness test. This could be a motivational tool, which could also offer morale-boosting information when progress was achieved.
- There will be communication between the centralized database and the DoD to ensure an on going quality control system and that analyses answer the questions appropriately.
- The statistical analytical results would provide valuable feedback, giving the services snapshots of their fitness levels as combat readiness is assessed, and allowing them to compare their progress with that of the other services.

4. GAP ANALYSIS

This section summarizes the status of data collection in the U.S. military services and discusses the possibility of creating a database that will be responsive to data collection and reporting requirements in the upcoming revised DoDI 1308.3. A notional database is defined and presented as an example for a potential DoD system. Recommendations are provided for bridging the gap between the current status of data collection and creating a database system that will fulfill the anticipated requirements.

4.1 Current Status of Data Collection

Each of the military services collects physical fitness and body composition test results; however, the variables collected and the manner in which they are collected vary between the services. Currently, only the Air Force and Navy have computerized databases for physical fitness and body composition results. The Navy uses the PRIMS which allows data entry of the test results, demographic information, and responses to the Physical Activity Risk Factor Questionnaire, a computerized questionnaire answered by the service member as part of the PFA. The Air Force uses FitSoft software and the FitManagement database system to store its data. Results from the cycle ergometry test are stored electronically and are uploaded into the database automatically. All other data are entered manually.

The Marine Corps and Army collect and record physical fitness and body composition information on paper. The Marine Corps uses the Total Force Data Warehouse personnel database to store overall fitness scores and the Army has no electronic data facility.

4.2 Future Reporting Requirements

The current version of the DoDI states that the goal of military physical fitness and body fat programs is to enhance general fitness and health, and to establish a mechanism for policy and research coordination among all military services. To enhance general fitness and health, all personnel will be tested for cardiovascular endurance and muscular strength and the results from these tests will be based upon a common set of statistics. With these statistics, trends for fitness and body composition will be monitored and program effectiveness evaluated.

It is anticipated that DoDI 1308.3 will specifically mandate all U.S. military services to report their physical fitness and weight management test results annually. The data mandated will probably include gender, age, rank/grade, and components indicating those who failed the fitness test and the body composition test, and those in remedial training or service-directed weight-control programs.

4.3 A Notional Multi-Services Weight Management Database

If a multi-services database is to be created, standardization among the services will be critical. While the DoDI will mandate many of the basic requirements for data reporting, procedural issues will need to be considered and agreed upon among the services before a database can be designed and developed. Agreement will be necessary on several issues: the data to be collected, naming conventions of the elements, the manner in which measurements will be taken, calibration of the equipment, the data flow process, type of database, quality control and security, and database administration and access.

This section outlines a notional multi-services weight management database as a beginning step in conceptualizing the potential process, based upon discussion at the Military Services Physical Fitness and Weight Management Database Workshop and research into characteristics of existing relevant databases. This notional description covers selection of variables, consistency of data naming and measurement protocols, database architecture, connectivity, and administration issues.

4.3.1 Data Variables Selection and Naming

The first step in the database development process is to obtain consensus among the services on issues such as what data should be gathered and what statistics should be reported. Initially, this effort will be based on the immediate needs of the services to answer DoDI queries with regard to their fitness and body composition programs.

Possible relevant variables to be collected are scores on physical fitness tests, weight, height, other body composition indicators, rank, age, gender, injury incidence, occupational specialty, enrollment in a remedial fitness program, and successful completion of fitness programs.

These data would be gathered and entered for each service member using identification markers such as SSN. Within the database, sensitive information such as a SSN would be in a separate secure file, and accessed only when necessary.

Consistency in the naming and coding of variables is a critical aspect for a centralized database. For example, a push-up should have a definition that is acceptable to all service branches. If data on push-ups are to be in a centralized database, the name and code for a push-up in the Army should be the same as in the Navy. Therefore, when data from the Army and Navy are transferred, the data for push-ups are obvious and can be legitimately combined and compared. This type of coordination in variable naming and the manner in which the data are collected must be agreed upon among the services.

4.3.2 Test and Measurement Protocols

Standardization is a critical process if data are to be collected and placed in databases within the military services, particularly if these data are to be used in statistical analyses. Many questions arise in considering the data collection process, and achieving consensus among the services on these issues is essential. For instance, where are data to be collected in each service? Will there be a regular and assigned location for the collection of the physical fitness and weight management data? Will this be done on the field, in the company/squadron area, or in the clinic? Who will take the measurements? How are personnel trained and monitored? The personnel who collect the measurements must be consistently trained and monitored. One efficient method of training is to have local master trainers, or personnel who have been trained and certified by an expert. Local master trainers then train and monitor all the local personnel who are involved in the collection of data. How are the data entered and what is the level of quality control over the data collection protocols?

Second, how will measurements be taken? Written protocols need to be established for developing methods that are appropriate for a military database; they must be clear and descriptive. In addition, detailed instructions need to be in each of the service's instructions on exactly how to perform a measurement to minimize variability. These protocols must be compatible across the services and with similar data collected by the NCHS so that the results of the military testing can be compared with corresponding national estimates. Agreement will have to be reached regarding the types of equipment used to collect the data and to ensure that the equipment is calibrated and this information recorded.

Quality control is very important for data collected within a service and for comparison between the services. This is especially significant if a common set of statistical analyses are to be used and reports generated for the DoD. Quality control key issues include reliability, validity, and accuracy, which depend on the level of training and the type of equipment used.

Reliability measures the consistency between the responses gathered on two separate occasions. Validity measures the consistency between the reported events, such as health-conditions or disability, and the true

status of the events. Validity can be evaluated in the following four ways: (1) content validity by the subjective evaluation of experts, (2) criterion validity by comparing measurements with gold standard, (3) construct validity by the relationship of the measurements with comparison measurements, and (4) predictive validity by predicting one variable from the others.

Data collection should be structured to have a minimal impact on personnel time and readiness of units. The current set of data collected, or that can be collected from the current set of physical fitness and weight management tests, may form an adequate number of parameters depending on the upcoming DoD requirements.

4.3.3 Data Flow

The data will first have to be collected within a service branch. This can be done at the company level and entered through computerized data-entry forms on a regular basis. Web access is an option that can be provided at an internet address with a ".mil" extension to selected staff within the services who have authorization to input their service's data. Interface opportunities and data storage can be arranged through a centralized, neutral DoD agency. On a specified basis, the selected data can be downloaded and transferred to the centralized database in a variety of methods, such as attached files or on disk. If access is granted and the database of each service is accessible, then the personnel at the centralized database can extract the needed data when necessary via a secure web-based program.

The Army will need to implement a system to input the PFT data. There are a variety of hand-held, computer-ready devices commercially available to facilitate data collection, entry, and transfer.

4.3.4 Database Design and Data Analysis

Gathering the same data parameters for the same population is the hallmark of a longitudinal database. This makes it possible, for example, to determine how the PFT score for an individual service member changes with time, to determine how the PFT scores of service members of one Military Occupational Specialty (MOS) differ from those with a different MOS, or to assess differences by rank or between the services. Analyses such as these can be requested by whomever the DoD selects as eligible. For example, the analysis can be requested at a brigade command level to determine how physical fitness is related to combat readiness or the request can be at the DoD level to compare the services or to monitor compliance with DoD instructions, such as 1308.3.

Longitudinal data can be analyzed cross-sectionally or longitudinally. The most important information provided by longitudinal data are trends and projection. Longitudinal data analysis allows for the prediction of future values from earlier values, which is important for implementing early intervention and prevention programs. For example, what is the success rate of passing the fitness test or meeting the body fat standard over years? What are the projected values five years from now?

Statistical reports, in general, include distribution statistics, mean, standard deviation, and selected percentiles for continuous measurements such as weight and waist circumference. For discrete variables, the proportion or frequency distribution is usually presented as the proportion of failures for fitness or weight management standards or as the proportion of those separated from the military.

The Fels Longitudinal database can be used to demonstrate the information that can be derived from a longitudinal database. Consider Figure 5. The horizontal axis shows calendar years at 10-year intervals from 1929 when the study commenced and the vertical axis denotes the ages of the participants. The oblique lines trace the passage of each annual cohort as its members become older. With this longitudinal database design, a vertical slice through the data allows, for example, the analysis of all measurements

recorded in 1989. The results would provide information about the status of individuals between birth and 60 years of age in 1989.

Alternatively, a horizontal slice could be made through the data as shown by the line drawn through the figure at the 40-year level (Figure 6). The analysis of the data in this slice could provide information about 40-year-old individuals born in different years.

The third possibility of examining longitudinal data is to cut an oblique slice through the data set (Figure 7). The analysis of the data in this oblique slice could provide information about changes within individuals over time. This type of analysis presents exciting possibilities that can only be achieved with longitudinal data. One can examine individual patterns of change and infer long-term trends for the group. Also, individuals can be assessed relative to peers. From longitudinal data analysis future projections can be achieved.
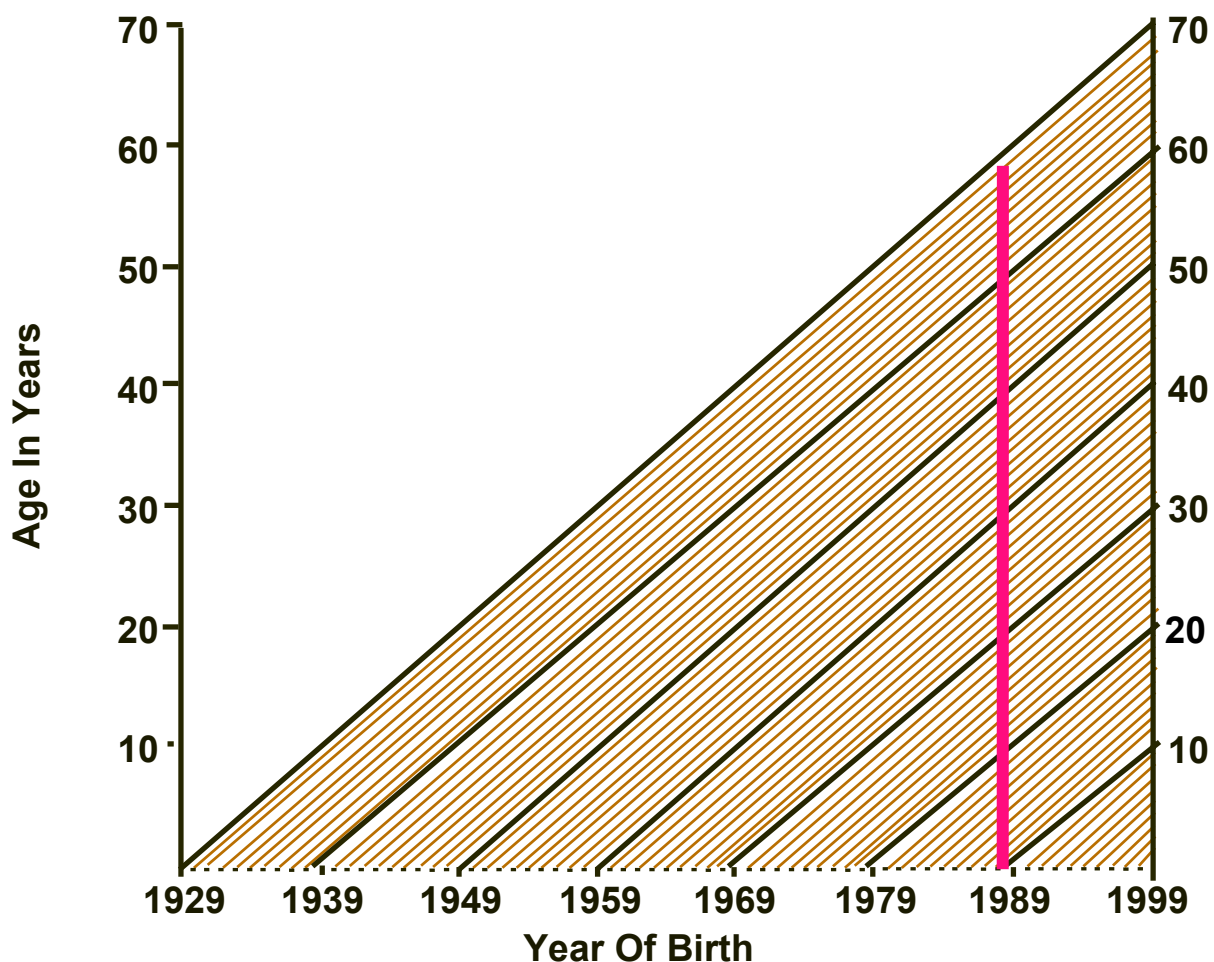
Figure 5. The longitudinal database and the cross-sectional analysis
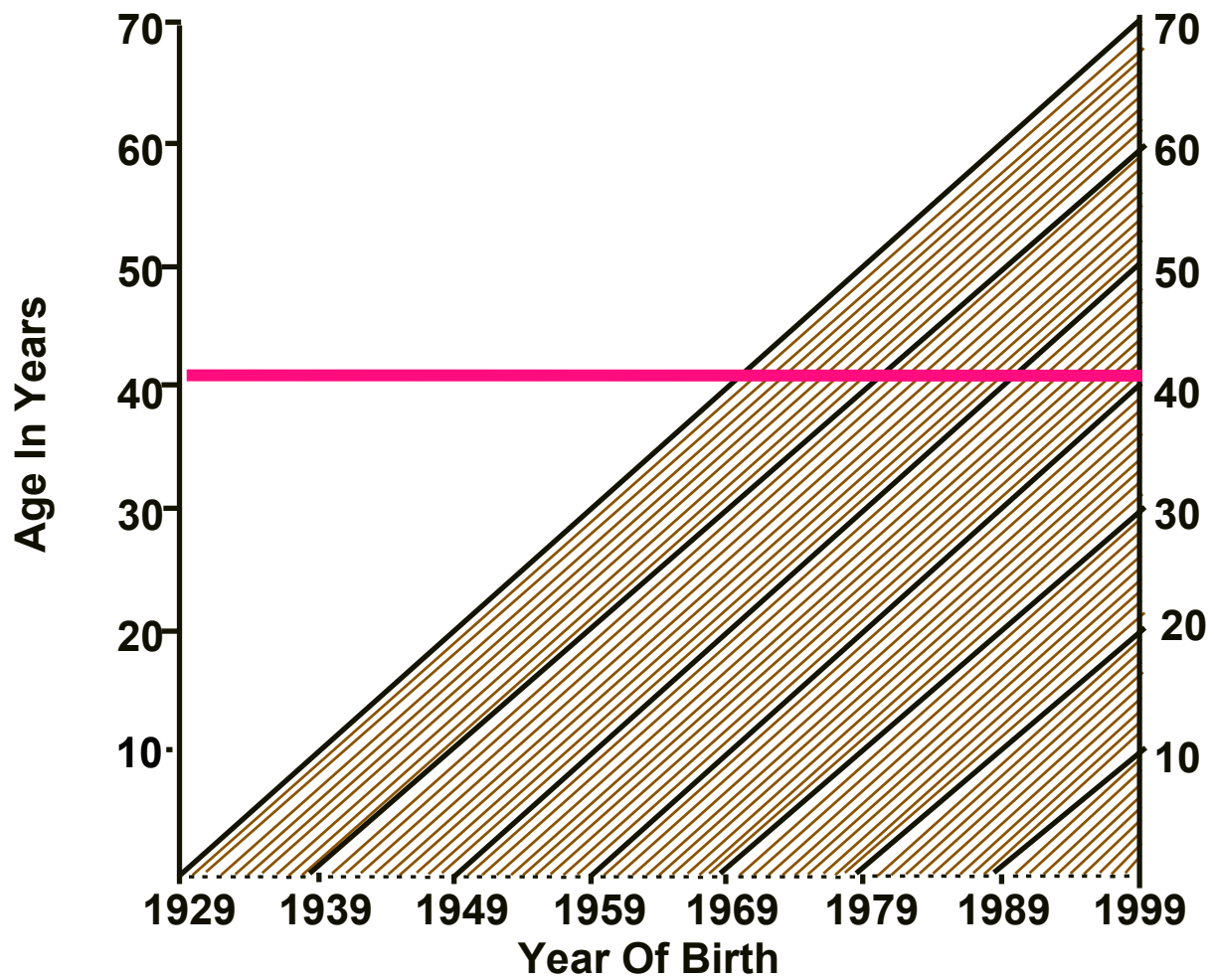
Figure 6. The longitudinal database and the cross-sectional analysis for secular trends
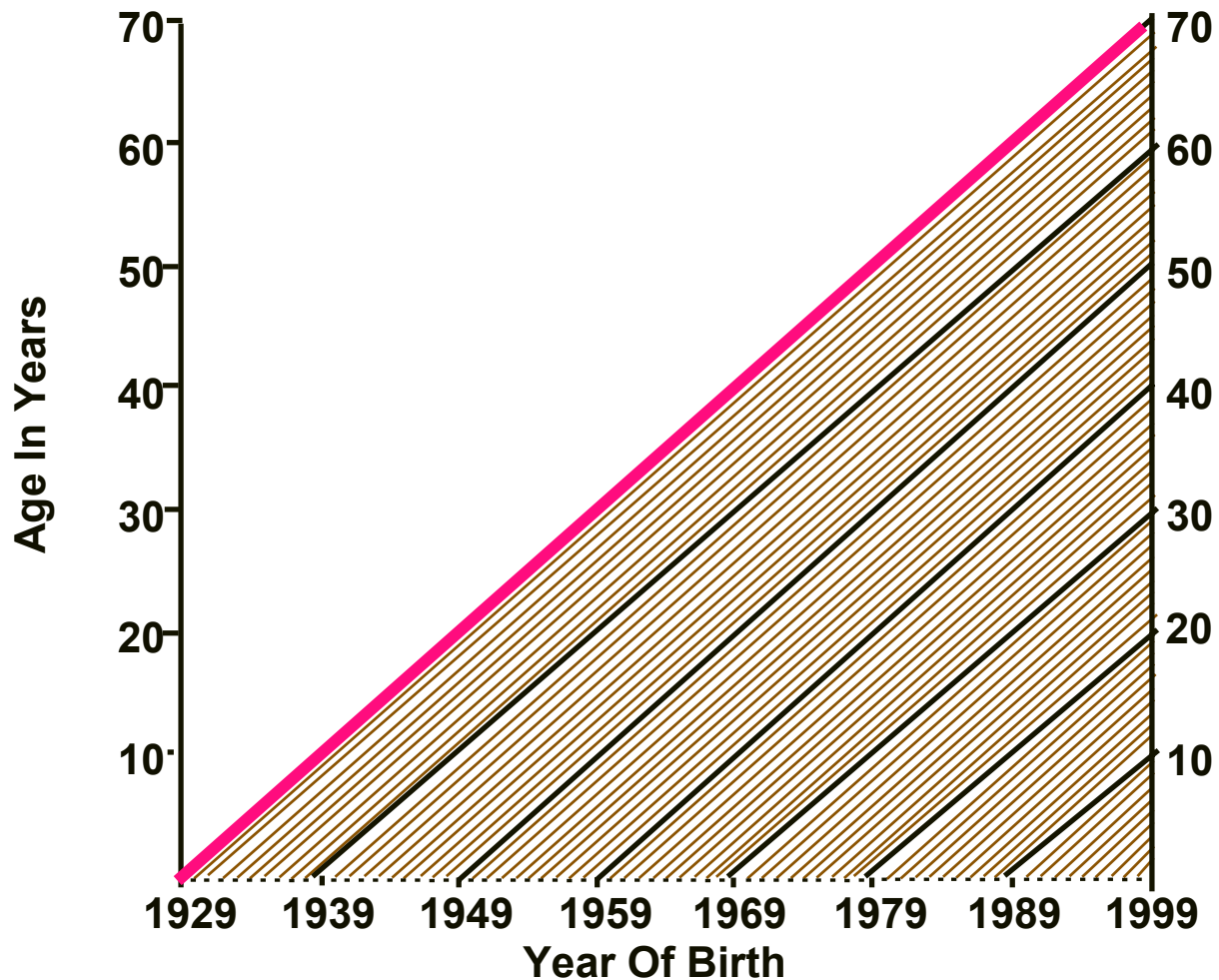
Figure 7. The longitudinal database and the longitudinal analysis trends over time for individuals and groups

The operations for any database include collaboration, communication, coordination, data management, and data analysis. Collaboration requires establishing contact among multiple services, DoD, and related agencies. It will be necessary to determine the measurements and instruments and maintain consistency across services. It will also necessary to determine the common set of statistics for reports so that comparisons can be made and data can be combined across services.

Collaboration requires close communication among the services. Systems for routine communication, including workshops and meetings among subject-matter experts and database experts, data preparation and dissemination, discussion, email, and conference calls, also need to be established. It will also be important to establish computer network systems for efficient accessibility of the data.

4.3.5 Data Management and Quality Control

Data management pertains to the development and maintenance of the database as well as the implementation of the computer software and hardware. As data are submitted, they will need to be monitored and edited for accuracy before being merged into the main database. There are also protocols for performing backups and archiving the data. File transfer protocol for data, reports, and documentation

needs to be established. And finally, the security and confidentiality of the database are essential for data integrity.

4.3.6 Connectivity to Other DoD Databases

A centralized longitudinal database, such as the one described above, would provide the DoD with an efficient means of generating standardized statistical reports with regard to physical fitness, military readiness, and weight management information across services. The database would also allow for group comparisons such as age and gender. More importantly, the longitudinal database will provide resources for monitoring long-term trends for physical fitness, health, and weight and body fat distribution. There is concern at the highest levels of the DoD that there be the capacity to link future databases in this content area with certain existing DoD military databases such as DEERS and CHCSII, as well as other databases focusing on health, personnel, and occupational factors. Figure 8 describes potential useful connections between existing and future databases and systems. The secondary, connecting boxes in the figure indicate the type of information that would be useful to the related databases. In addition, Appendix B lists some of the current databases to which connectivity might be desired.
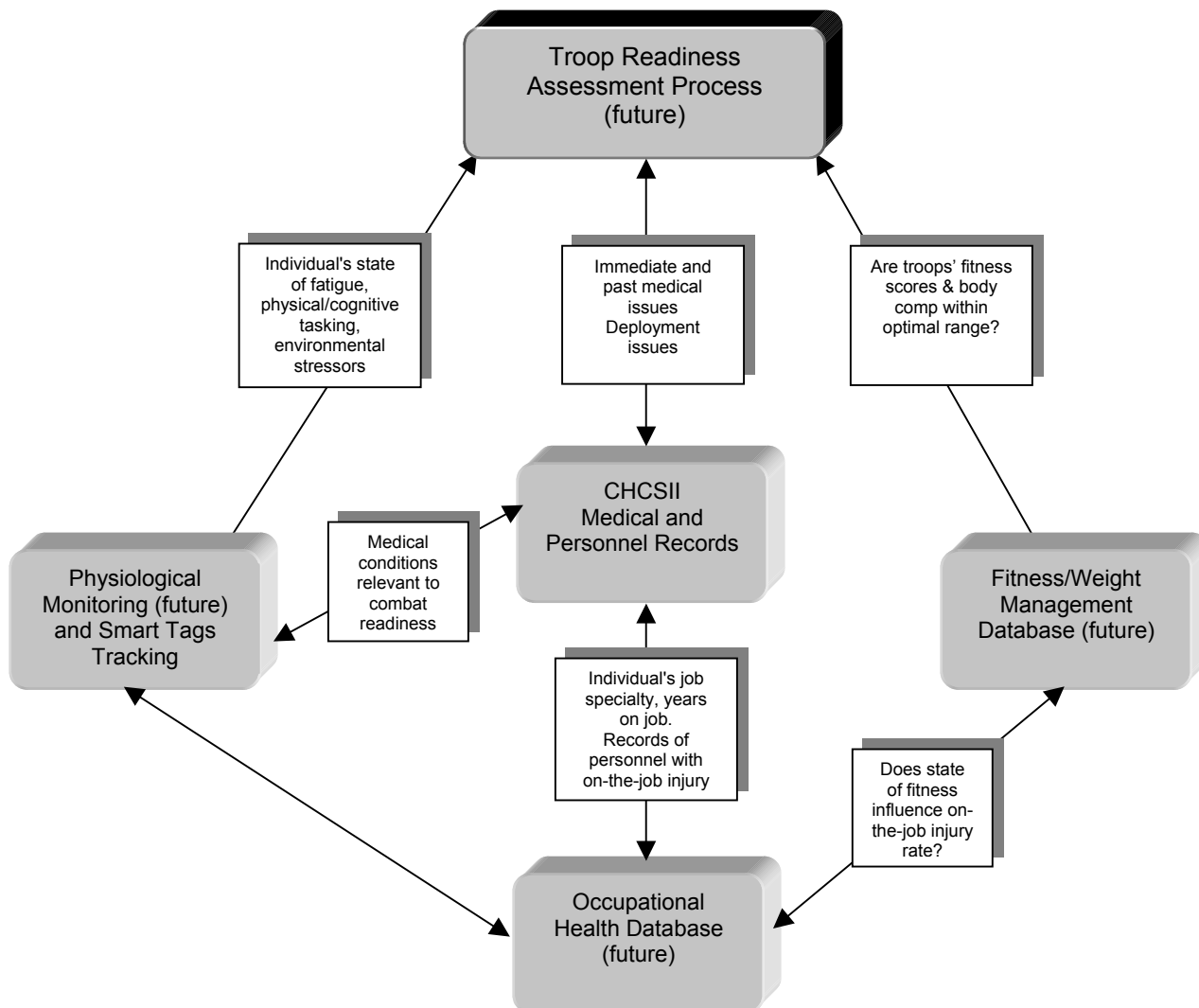
Figure 8. How relevant Department of Defense databases will need to work together to provide near-real-time readiness assessments

4.3.7 Location and Administration

A central organization with substantial longitudinal database experience should design and maintain the database and fulfill the annual reporting requirement for the services. The database should be located in a single location where professional and support staff will be available to coordinate data transfer, manage the stored data, conduct the required statistical analyses, and prepare reports for the DoD.

4.4 Roadmap

To accomplish a major undertaking such as a centralized military database, the formation of a steering committee could begin the task of generating consensus among services and to lead the planning of a standardized protocol. Issues for discussion may include, for example, selection of measurements and instruments, data collection techniques, database management systems, communications, and statistical reports. This steering committee might include decision makers within Army, Navy, Air Force, Marine Corps, DoD institutions such as the Human Systems Information Analysis Center, and Wright State University.

The steering committee may choose to select and standardize, if applicable, measurements and instruments with flexibility for the accommodation of differences among the services. The steering committee could also form a subcommittee to undertake specific tasks. For example, a data quality control subcommittee could be formed to establish data quality control protocol including the selection and calibration of instruments, and training and monitoring of staffs. Finally, the steering committee should identify an organization to design and maintain the database.

5. ACRONYMS

ACHCP – Appropriately Credentialed Health Care Provider

ACIPS – Army Casualty Information Processing System

AFCHIPS – Air Force Corporate Health Information Processing System

AFI – Air Force Instruction

AFMOA – Air Force Medical Operations Agency

AFPC – Air Force Personnel Center

AIS – Automated Information System

APFT – Army Physical Fitness Test

AR – Army Regulation

BCA – Body Composition Assessment

BMI – Body Mass Index

BUMEDS – Bureau of Medicine and Surgery

BUPERS – Bureau of Naval Personnel

CCEP – Comprehensive Clinical Evaluation Program

CDC – Center for Disease Control

CFL – Command Fitness Leaders

CHCBP – Continued Health Care Benefit Program

CHCSII – Composite Health Care System II

CO – Commanding Officer

CPR – Computer-Based Patient Record

DA – Department of the Army

DEERS – Defense Enrollment Eligibility Reporting System

DMDC – Defense Manpower Data Center

DoD – Department of Defense

DoDI – Department of Defense Instruction

DoDD – Department of Defense Directive

DOHRS – Defense Occupational Health Readiness System

FEP – Fitness Enhancement Program

FM – Field Manual

FPM – Fitness Program Manager

FTP – File Transfer Protocol

GAO – General Accounting Office

HAWC – Health and Wellness Center

HEAR – Health Enrollment Assessment Review

HSIAC – Human Systems Information Analysis Center

HSRB – Human Subject Review Board

IRB – Institutional Review Board

MAJCOM – Major Air Command

MCO – Marine Corp Order

MCS – Millennium Cohort Study

MCTFS – Marine Corps Total Force System

MFIP – Monitored Fitness Improvement Program

MOS – Military Occupational Specialty

MWR – Morale, Welfare and Recreation

NCHS – National Center for Health Statistics

NHANES – National Health and Nutrition Examination Survey

NIH – National Institutes of Health

NIST – National Institute of Standards and Technology

NSIAD – National Security and International Affairs Division

OIC – Officer in Charge

OPHSA – Office for Prevention and Health Services Assessment

OPNAVINST – Office of Naval Operations Instruction

OSD – Office of the Secretary of Defense

PASBA – Patient Administration and Biostatistics Activity

PCP – Physical Conditioning Program

PERSCOM – Personnel Command

PFA – Physical Fitness Assessment

PFT – Physical Fitness Test

PKI – Personal Key Infrastructure

PHQ – Patient Health Questionnaire

PRIMS – Physical Readiness Information Management System

PRP – Physical Readiness Program

PRT – Physical Readiness Test

QA – Quality Assurance

QC – Quality Control

RAP – Recruit Assessment Program

SFIP – Self-Directed Fitness Improvement Program

SSN – Social Security Number

TAIHOD – Total Army Injury and Health Outcomes Database

TFDW – Total Force Data Warehouse

TMIP – Theater Medical Information Program

UFPM – Unit Fitness Program Manager

USARIEM – U.S. Army Research Institute of Environmental Medicine

USASC – U.S. Army Safety Center

USDA – U.S. Department of Agriculture

VA – Department of Veterans Affairs

WBFMP – Weight and Body Fat Management Program

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APPENDIX A:

PHYSICAL FITNESS AND BODY COMPOSITION COMPARISON CHARTS

Table 4. Physical Fitness Assessment Standards, Adjusted for Age and Gender, Across Services (Minimum Standards)

	ARMY			NAVY			AIR FORCE			MARINE CORPS		
Aerobic Capacity	2-mile run (min:sec)			1.5-mile run/walk (min:sec)			submaximal cycle ergometry (ml/kg-min VO2 max)			3-mile run (min)		
	Age	Male	Female	Age	Male	Female	Age	Male	Female	Age	Male	Female
Active Force	17-21	15:54	18:54	17-19	12:30	15:00				17-26	28	31
	22-26	16:36	19:36				<24	27	35			
	27-31	17:00	20:30	20-29	13:30	15:30	25-29	27	34	27-39	29	32
	32-36	17:42	21:42				30-34	27	32			
	37-41	18:18	22:42	30-39	14:30	16:45	35-39	26	31	40-45	30	33
	42-46	18:42	23:42				40-44	26	30			
	47-51	19:30	24:00	40-49	15:30	17:15	45-49	25	29	46+	33	36
	52-56	19:48	24:24				50-54	24	28			
	57-61	19:54	24:48	50+	16:45	17:30	55-59	22	27			
	62+	20:00	25:00									
Basic Training	17-21	16:36	19:42	17-19	11:00	13:30	2-Mile Run (min:sec)			Same as Active Force		
	22-26	17:30	20:36	20-29	12:00	14:15	<30	18:00	21:00			
	27-31	17:54	21:42	30-39	13:45	15:30	>30	20:00	23:00			
	32-36	18:48	23:06									
Upper Body Muscular Fitness	Push-ups in 2 minutes			Push-ups in 2 minutes			*Push-ups in 2 minutes (see note)**			Pull-ups (Males) Flexed Arm Hang (Females)		
	Age	Male	Female	Age	Male	Female	Age	Male	Female	Age	Male	Female
	17-21	42	19	17-19	42	19				17-26	3	15 sec
	22-26	40	17				<24	*42*	*19*			
	27-31	39	17	20-29	37	16	25-29	*40*	*17*	27-39	3	15 sec
	32-36	36	15				30-34	*36*	*15*			
	37-41	34	13	30-39	31	11	35-39	*34*	*13*	40-45	3	15 sec
	42-46	30	12				40-44	*30*	*12*			
	47-51	25	10	40-49	24	7	45-49	*25*	*10*	46+	3	15 sec
	52-56	20	9				50-54	*20*	*9*			
	57-61	18	8	50+	19	2	55-59	*18*	*8*			
	62+	16	7									
Basic Training	17-21	35	13	17-19	51	24	All	32	14	Same as Active Force		
	22-26	31	11	20-29	47	21						
	27-31	30	10	30-39	41	17						
	32-36	26	9									
Abdominal Muscular Fitness	Sit-ups in 2 minutes			Curl-ups in 2 minutes			*Crunches in 2 minutes (see note)**			Crunches in 2 minutes		
	Age	Male	Female	Age	Male	Female	Age	Male	Female	Age	Male	Female
	17-21	53	53	17-19	50	50				17-26	50	50
	22-26	50	50				<24	*53*	*53*			
	27-31	45	45	20-29	46	46	25-29	*50*	*50*	27-39	45	45
	32-36	42	42				30-34	*42*	*42*			
	37-41	38	38	30-39	40	40	35-39	*38*	*38*	40-45	45	45
	42-46	32	32				40-44	*32*	*32*			
	47-51	30	30	40-49	35	35	45-49	*30*	*30*	46+	40	40
	52-56	28	28				50-54	*28*	*28*			
	57-61	27	27	50+	29	29	55-59	*27*	*27*			
	62+	26	26									
Basic Training	17-21	47	47	17-19	62	62	All	45	45	Same as Active Force		
	22-26	43	43	20-29	58	58						
	27-31	36	36	30-39	51	51	*Proposed addition of calisthenics remains in trial period*					
	32-36	34	34									

Table 5. Alternative U.S. Army Test Standards By Event, Gender, and Age (Minimum Standards)

AGE	800-Yard Swim Male	800-Yard Swim Female	6.2-Mile Bike Male	6.2-Mile Bike Female	2.5-Mile Walk Male	2.5-Mile Walk Female
17-21	20:00	21:00	24:00	25:00	34:00	37:00
22-26	20:30	21:30	24:30	25:30	34:30	37:30
27-31	21:00	22:00	25:00	26:00	35:00	38:00
32-36	21:30	22:30	25:30	26:30	35:30	38:30
37-41	22:00	23:00	26:00	27:00	36:00	39:00
42-46	22:30	23:30	27:00	28:00	36:30	39:30
47-51	23:00	24:00	28:00	30:00	37:00	40:00
52-56	24:00	25:00	30:00	32:00	37:30	40:30
57-61	24:30	25:30	31:00	33:00	38:00	41:00
62 +	25:00	26:00	32:00	34:00	38:30	41:30

Source:
Army FM 21-20 *Physical Fitness Training*

Table 6. Maximum Body Fat Standards Across Services

Service	Gender	17-20	21-27	28-30	31-39	40+
Army	**M**	20%	22%	24%	24%	26%
	F	30%	32%	34%	34%	36%
Navy	**M**	22%				23%
	F	33%				34%
Air Force	**M**	20% (≤ 29 years)			24% (>30 years)	
	F	28% (≤ 29 years)			32% (>30 years)	
USMC	**M**	18%				
	F	26%				

Sources:
Army – AR 600-9 *Army Weight Control Program (Interim Change 1)*
Navy – OPNAVINST 6110.1F *Physical Readiness Program*
Air Force – AFI 40-502 *The Weight and Body Fat Management Program*
Marine Corps – MCO 6100.10B *Weight Control and Military Appearance*

APPENDIX B:

TABLE OF OTHER RELEVANT DATABASES

Program	Database	Name	Function	Originated	Connections
Fitness/ WM	**PRIMS**	Physical Readiness Information Management System	The Physical Readiness Information Management System (PRIMS) was developed to automate the process of administering and maintaining the Physical Readiness Program IAW OPNAVINST 6110.1F.	Navy	BUMED
Fitness/ WM	**FitManagement**	Fitness Management	FitManagement is a user-developed and supported program that helps Fitness Program Managers manage FitSoft to produce rosters and fitness program status reports.	Air Force	
Health	**CHID**	Combined Health Information Database	CHID is a bibliographic database produced by health-related agencies of the federal government. This database provides titles, abstracts, and availability information for health information and health education resources.	National Institutes of Health; Centers for Disease Control and Prevention, Health Resources and Services Administration.	CHID covers 16 topics from a combination of several Federal agencies.
Health	**DOEHRS**	Defense Occupational and Environmental Health Readiness System	The DOEHRS is being developed as a comprehensive, tri-service Automated Information System (AIS) for assembling, comparing, using, evaluating, and storing occupational personnel exposure information, baseline medical examination data, workplace environmental monitoring data, personal protective equipment usage data, observation of work practices data, and employee health-hazard education data.	DOD, Army, Navy, Marine Corps, Air Force	
Health	**NAMHIS**	Navy Mental Health Information System	NAMHIS has been developed by the Naval Health Research Center for use in Navy outpatient mental health clinics. NAMHIS provides three major services: medical record - keeping system, management information system, scientific database.	Navy	The Computer Stored Ambulatory Record (COSTAR) software has been modified to serve for automation of NAMHIS and accommodate the necessary data elements of Navy outpatient mental health (i.e., Patient Registration, Encounter Data, Patient History, Mental Status Examination, and Reporting Capability).
Health	**NHANES**	National Health and Nutrition Examination Survey	This survey has been designed to collect information about the health and diet of people in the United States.	National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention.	

Program	Database	Name	Function	Originated	Connections
Health	**TAIHOD**	The Total Army Injury and Health Outcomes Database	The TAIHOD is a versatile system that joins multiple personnel and health datasets from various defense department agencies.	Army (USARIEM)	Defense Manpower Data Center (DMDC)
Injury	**Atlas of Injuries in the U.S. Armed Forces**		Information provided from DOD, Army, Navy, Marine Corps, and Air Force databases that documents the occurrence of injuries in military personnel.	DOD, Army, Navy, Marine Corps, Air Force	The Atlas will become a website.
Injury	**WISQARS**	Web-based Injury Statistics Query and Reporting System	Interactive system that provides injury-related mortality data useful for research and for making informed public health decisions.	CDC- National Center for Health Statistics	
Injury	**OSHSYS**	Occupational Safety and Health System	This powerful database tool and software systems assist the Navy Occupational Safety and Health Program Manager in analyzing workplace injuries and illnesses, pinpointing risk factors to guide the development of better intervention and control measures, and evaluating the effectiveness of worksite changes.	Navy- National Health Research Center (NHRC)	U.S. Department of Labor Office of Worker's Compensation Program and the Department of the Navy Civilian Personnel Data System Center
Medical	**EPISYS**	Epidemiological Interactive System	EPISYS was developed to integrate Navy inpatient hospitalization files with career history and demographic files to form a single system with a flexible interface.	Navy	
Medical	**AMDRS**	Aviation Medical Data Retrieval Systems	The database functions as the central repository for all aviation, combat readiness, and Flag/General Officers' and spouses' physicals. Aviation medical database system is specifically designed to improve support to Navy and Marine Corp aviation personnel.	Navy	AEDR-Aviation Epidemiological Data register ; AMDB-Aviation Medical Data Bank; APQTS-AMDRS Physical qualification and tracking system; PEAS-Physical Examination Accession System; MIIS-Medical Information Imaging System
Medical	**DMSS**	Defense Medical Surveillance System	Defense Medical Surveillance System (DMSS), an executive information system whose database contains up-to-date and historical data on diseases and medical events (e.g., hospitalizations, ambulatory visits, reportable diseases, HIV tests, acute respiratory diseases, and health risk appraisals) and longitudinal data on personnel and deployments.	Database maintained by the Army Medical Surveillance Activity	DMED- Defense Medical Epidemiological Database. The DMED application provides a user-friendly interface with DMSS in which users may perform queries regarding disease and injury rates and relative burdens of disease in active duty populations

Program	Database	Name	Function	Originated	Connections
Occupational Health	**NOHIMS**	Navy's Occupational Health Information Management System	Tracks workers by Social Security Number through their entire work history and significant medical encounters.	Navy	
Personnel	**DEERS**	Defense Enrollment Eligibility Reporting System	DEERS currently is the central source for personnel information from the DoD Personnel community. In addition, DEERS will continue to be the source for determining DoD medical benefits eligibility.	DMDC- Defense Manpower Data Center	DMDC maintains the largest archive of personnel, manpower, training and financial data in the DoD.
Personnel	**CHAMPS**	Career History Archival Medical and Personnel System	CHAMPS research database is a computerized medical and personnel database that provides extensive information for Naval medical management of occupational health and epidemiologic research.	Navy- National Health Research Center (NHRC)	CHAMPS expanded the existing Navy enlisted longitudinal database to include data for Navy officers, Marine Corps officers and enlisted personnel.
Personnel	**TFDW**	Total Force Data Warehouse	The Total Force Data Warehouse (TFDW) is a repository of historical data and a set of decision support tools that will permit Manpower Planners and Analysts to develop the analysis that supports strategic decisions made about accessions, training, promotions, and retention. The database contains all personnel records dating back to 1988.	Marines	This warehouse will eventually be fed from a number of legacy systems. For the initial active duty pilot, the source system will be the Marine Corps Total Force System (MCTFS).
Personnel	**RAP**	Recruit Assessment Program	The Recruit Assessment Program seeks to collect baseline health data on all military members, which is recognized as essential for understanding health risks prior to entrance in the military, understanding how service-related exposures affect health, and developing early intervention and prevention programs to protect health and readiness.	Defense, Veterans Affairs and Health and Human Services	The purpose of this study is to demonstrate the feasibility of routinely obtaining computerized baseline health data from the thousands of recruits that enter such facilities each year.
Personnel	**MilMod**	Air Force Military Personnel Data System Modernization program	MilMod is a Total Force system. MilMod supports all personnel "life cycle" management functions from recruitment through job assignment and ultimately separation or retirement.	Air Force	Technical Assistance Center (TAC) Personnel Systems Management (PSM)
Personnel	**BUPERS**	Bureau of Personnel	BUPERS provides accurate, reliable and readily accessible personnel information for fleet personnel.	Navy	NSIPS (Navy Standard Integrated Personnel System). Single point of entry system at the field level ashore and afloat. System will store, pass, use, and report personnel and pay data for all Navy active duty, reserve (467,899 records) and retired personnel

Program	Database	Name	Function	Originated	Connections
Personnel	**PERSCOM**	Personnel Command	PERSCOM's goal is to ensure that Army acquisitions, from computer systems such as the Army Recruiting Information Support System to weapons systems like the Crusader, consider the soldier first and foremost during every phase of the acquisition process.	Army	OMPF (Official Military Personnel File)
Wellness	**DONSIR**	Department of Navy Suicide Incident Report	Used in the development of a standardized suicide database for all Navy and Marine Corps.	Navy	
Health	**MCS**	Millennium Cohort Study	MCS is a scientific research project that will follow a total of 140,000 US military personnel during and after their military service for up to 21 years. The goal of MCS is to evaluate the health risks of military deployment, military occupations, and general military service.	DoD	

APPENDIX C:

**MILITARY DATABASE COMPARISON –
PRIMS AND FITMANAGEMENT**

	Navy *PRIMS*	**Air Force** *FitManagement/FitSoft*
Overview	**Scope**	
	• Collect physical readiness data • Prepare collected data for submission to Navy Personnel Command • Data maintenance • Disseminate results	• **FitManagement** and **FitSoft** utilize a bi-directional data flow from a central personnel system through AF medical record system to local fitness installation. **FitSoft (FS)** • Testing database for aerobic and muscular fitness assessment **FitManagement (FM)** • Report generator • Data manipulator • Inputs data into AF central database • FitSoft Management Tool
	Installation	
	• Internet (PRIMS website) • CD • Floppy disk	• **FM** – Internet download from the AF Population Health Support Office
	Program Language	
	• Visual FoxPro 6.0 with Oracle database	• Visual Basic • **FM** – Access and Excel
	Latest Version	
	• PRIMS 1.0.11 (21 May 2001)	• **FM** – 21 September 2001 • **FS** – FitSoft 3.0
	Platform	
	• Networked • Stand-alone PC	• Website • Stand-alone PC
Input	• Command Fitness Leaders	• Command Fitness Leaders
Security	• User profiles to maintain security • Valid user ID and password required	• Computer access is password-protected • Tracking of who enters data and also accesses the database
Modules	• Begin PFA cycle • Create base of members • Conduct risk assessment • Complete medical referrals/waivers • Perform body composition measurements • Conduct physical readiness test • Export data to PERSCOM • Complete reports	• Units • People • Test records • SFIP and MFIP • Reports • Rosters • Data management • Setup • Exit
Data	**Personnel/People**	
	• Search for member using SSN • Browse for member • Delete member	• Search for member using SSN • View individual fitness assessment data • View individual improvement program • Edit data

	Navy *PRIMS*	**Air Force** *FitManagement/FitSoft*
(Data, Cont.)	**Setup**	
	• Input new members	• **FM –** Indicate where FitManagement will look for test results source files and management information
	Questionnaire	
	• Risk Assessment Questionnaire • On-line or hardcopy distribution • Export for completion on browser	• **FS –** Fitness Screening Questionnaire • Hardcopy distribution
	Body Composition and Physical Fitness	
	• Participation status • Sit-reach results • PRT test results and classification item/score/category/level	**FS:** • Aerobic fitness assessment • Manual aerobic fitness assessment • Practice aerobic fitness assessment • Muscular fitness assessment
	Consequences	
	Fitness Enhancement Program – Required for members who: • Failed the BCA • Failed the PRT • Have body fat % equal to age-adjusted standard • Scored "Satisfactory-Marginal" on PRT	**FM –** Fitness Improvement Program Tracking – Required for members who: • Fail the cycle ergometry test
Reports	**Member PRT Results**	
	Print member PRT results: • Section 1 – Body composition and PRT • Section 2 – Progression chart • Section 3 – Recommendation for future PFAs	**FM:** Use Test Records Module to: • View/print individual test details • Enter test results manually
	Command/Unit PRT Summary	
	Command summary is broken down as follows: • PRT participation information • PRT non-participation information • Body composition measurement information • PRT test results summary	**FM:** The Reports Module allows viewing or printing of 15 types of reports. For example: • Body Mass Index of individuals with BMI greater than designated • Individuals with high test scores
	Contingencies	
	• Results of participation in the Command Fitness Enhancement Program	**FM:** • Self-directed Fitness Improvement Program (SFIP) and Monitored Fitness Improvement Program (MFIP) Module displays test data for all individuals placed in a Fitness Improvement Program • Allows for tracking of improvement and success rates

	Navy *PRIMS*	Air Force *FitManagement/FitSoft*
Links to Other Databases	• Not applicable	• Data flow from Fit Management OPHSA Fitness Status data and the Air Force Personnel Computer – Demographic/Fitness status
Forms	**Letters of Notification**	
	• Report failure for Officers/Enlisted	• Exemption data • Medical exemption letter
	Others	
	• User-defined SF600 • Tailor-fit SF600(Medical Record Form) to send to Medical Personnel	• Roster information
	Blank Questionnaire	
	• Print questionnaire to use with discretion	• N/A
Importing Data	**New Member Data**	
	• Imports only new member personnel data	• Data are transmitted from the Air Force central personnel computer system through the central Air Force medical computer to each installation's local database
	Questionnaire	
	• Imports a member's Risk Assessment Questionnaire from disk	• N/A
	PRT Data	
	• Imports all data from the satellite office into the main database	• Automatically follows the member when transferred to a new installation
Exporting Data	**Member Data**	
	• Exported for member to transfer to next command	• Automatically exported from Fitness Center
	NAVPERSCOM/Command Data	
	• Send PFA results to PERS-651	• Program manager sends weekly reports to OPHSA and to the Air Force Personnel Computer
	Questionnaire	
	• Export to complete the Risk Assessment Questionnaire	• N/A
	Personnel Data	
	• Transfer member's personnel data to a central database for processing	• Fitness center transmits test results to OPHSA which then transmits to the Air Force Personnel Computer
	PRT Data to Central Database	
	• PRT data to Command Fitness Leader's database	• Fitness center transmits test results to OPHSA which then transmits to the Air Force Personnel Computer

	Navy *PRIMS*	**Air Force** *FitManagement/FitSoft*
Utilities	• Command information/Setup • PRT Checklist • Recreate index files • Backup data • Restore data • User administration • Preferences • Create PFA base • Database maintenance • Generic file view	**FM:** • Preview reports • Print reports (approximately 15 types) • Export reports • Recalculate all records • Test summary • Tobacco statistics • Webpage connection • Automatically waive students • Enable FTP to automatically send and receive updates electronically
Comments	**Pros**	
	• PRIMS is a useful tool for tracking and analyzing PFA data	• Provides current information within a week or two of the last person who reported to the station • Reports generated automatically
	Cons	
	• Only 20% on the Navy data is received at the Morale, Welfare and Recreation (MWR) Fitness Division from PRIMS • The MWR Fitness Division has stated that PRMIS is too time consuming and unreliable, lacks quality control, and is not user friendly	• Height and weight data not included in either **FM** or **FS**
	Goals	
	• Web-based application • Easier data collection • Reduce workload for the CFL • Share data with other databases (DEERS) • Training through the web system	• None to report

APPENDIX D:

LIST OF ATTENDEES

LTC Gaston Bathalon
US Army Medical Research of Environmental
Nutrition
ATTN: MCMR-EMN Military Nutrition Division
42 Kansas Street
Natick, MA 01760-5007
Telephone: (508) 233-5128
Email: gaston.bathalon@na.amedd.army.mil

Dr. Neal Baumgartner
Human Systems IAC
2602 Doolittle Road, Bldg. 804
Brooks AFB, TX 78235
Telephone: (210) 536-5060
Email: neal.baumgartner@brooks.af.mil

LCDR Neal Carlson
Navy Personnel Command
Health & Physical Fitness Branch
5720 Integrity Drive
Millington, TN 38055-6510
Telephone: (901) 874-4242
Email: p651f@persnet.navy.mil

Dr. Cameron Chumlea
Wright State University
School of Medicine
3171 Research Blvd. Rm. 229b
Dayton, OH 45420
Telephone: (937) 775-1428
Email: cameron.chumlea@wright.edu

LT Barry Cohen
Navy Personnel Command
Health & Physical Fitness Branch
5720 Integrity Drive
Millington, TN 38055-6510
Telephone: (901) 874-4257
Email: p651f2@persnet.navy.mil

Dr. Stefan Constable
USAF School of Aerospace Medicine
2602 Louis Bauer Rd.
Brooks AFB, TX 78235
Telephone: (210) 536-4613
Email: stefan.constable@brooks.af.mil

Dr. Katherine Flegal
U.S. Department of Health and Human Services
 National Center for Health Statistics - Division
of Data Services
6525 Belcrest Road
Hyattsville, MD 20782
Telephone: (301) 458-4215
Email: kmf2@cdc.gov

Dr. Robert Foster
Office of the Secretary of Defense
Rosslyn Plaza North
1777 North Kent Street, #9030
Arlington, VA 22209
Telephone: (703) 588-7420
Email: biosystems@dtic.mil

LTC Karl E. Friedl
Military Operational Medicine Research
Program
U.S. Army Medical Research & Materiel
Command
ATTN: MCMR LTC Friedl
Fort Detrick, MD 21702-5012
Telephone: (301) 619-7301
Email: karl.friedl@det.amedd.army.mil

Mr. William Gleason
Office of the Assistant Secretary of Defense
Force Management Policy (OASD - FMP)
4000 Defense Pentagon
Washington, DC 20301
Telephone: (703) 602-5012
Email: gleasonw@pr.osd.mil

Dr. Shumei Guo
Wright State University
School of Medicine
3171 Research Blvd.
Dayton, OH 45420-
Telephone: (937) 775-1414
Email: shumei.guo@wright.edu

Dr. James Hodgdon
Naval Health Research Center
P.O. Box 85122
San Diego, CA 92186-5122
Telephone: (619) 553-0676
Email: hodgdon@nhrc.navy.mil

Dr. Craig Hyams
Department of Veterans Affairs
VA Central Office (13A)
810 Vermont Avenue, N.W.
Washington, DC 20420-
Telephone: (202) 273-8575
Email: hyamsk@mail.va.gov

LCDR Kathleen Kujawa
Naval Health Research Center
P.O. Box 85122
San Diego, CA 92186-5122
Telephone: (619) 553-0645
Email: kujawa@nhrc.navy.mil

Ms. Theresa Martinez
55 AMDS/SGPZ
2501 Capehart Road
Suite 1105
Offutt AFB, NE 68113-2160
Telephone: (402) 294-5977
Email: theresa.martinez@offutt.af.mil

Dr. Joe McDaniel
Air Force Research Laboratory - HECI
2210 Eighth Street
Building 146
Wright-Patterson AFB, OH 45433-7511
Telephone: (937) 255-2558
Email: joe.mcdaniel@wpafb.af.mil

MAJ Brian McGuire
Training Command
Bldg. 2008
3000 Russell Road
Quantico, VA 22134
Telephone: (703) 784-3046
Email: mcguirebj@tecom.usmc.mil

Ms. Barbara Palmer
Human Systems IAC
AFRL/HEC/HSIAC
2261 Monahan Way, Bldg. 196
Wright-Patterson AFB, OH 45433-7022
Telephone: (937) 255-5215
Email: barbara.palmer@wpafb.af.mil

Maj Anthony Robbins
Air Force Medical Operations Agency
AFMOA/SGZZ
2602 Doolittle Road, Bldg 804
Brooks AFB, TX 78235-5249
Telephone: (210) 536-6509
Email: anthony.robbins@brooks.af.mil

Ms. Beth Rogers
Human Systems IAC
AFRL/HEC/HSIAC
2261 Monahan Way, Bldg. 196
Wright-Patterson AFB, OH 45433-7022
Telephone: (937) 255-4259
Email: beth.rogers@wpafb.af.mil

Dr. Donna Ryan
Pennington Biomedical Research Center
6400 Perkins Road
Baton Rouge, LA 70808-
Telephone: (225) 763-2514
Email: ryandh@pbrc.edu

Maj Lisa Schmidt
Office of the Surgeon General
Health Promotion Operations
110 Luke Ave. Room 45
Bolling AFB, DC 20332
Telephone: (202) 767-0187
Email: lisa.schmidt@USAFSG.bolling.af.mil

Ms. Becky Singer
Human Systems IAC
 AFRL/HEC/HSIAC
2261 Monahan Way, Bldg. 196
Wright-Patterson AFB, OH 45433-7022
Telephone: (937) 255-2477
Email: becky.singer@wpafb.af.mil

Ms. Julie Smith
Human Systems IAC
AFRL/HEC/HSIAC
2261 Monahan Way, Bldg 196
Wright-Patterson AFB, OH 45433-7022
Telephone: (937) 255-3986
Email: julie.smith2@wpafb.af.mil

LTC Linda Williams
Army Health Promotion Policy Officer -
ODCSPER
HDQA (DAPE-HR-PR)
300 Army Pentagon, Room 2B659
Washington, DC 20310
Telephone: (703) 695-5729
Email: linda.williams@hqda.army.mil

Dr. Donald Williamson
Pennington Biomedical Research Center
6400 Perkins Road
Baton Rouge, LA 70808-
Telephone:
Email: williada@pbrc.edu

APPENDIX E:

MILITARY SERVICES INSTRUCTIONS AND REGULATIONS

FM 21-20

PHYSICAL FITNESS TRAINING

CHAPTER 14

ABOUT HUMAN SYSTEMS IAC

The Human Systems Information Analysis Center (Human Systems IAC, HSIAC) is the gateway to worldwide sources of up-to-date human factors and ergonomics information and technologies for designers, engineers, researchers, and human factors specialists. Human Systems IAC provides a variety of products and services to government, industry, and academia while promoting the use of human factors and ergonomics in the design of human-operated equipment and systems.

Human Systems IAC's primary objective is to acquire, analyze, and disseminate timely information on human factors and ergonomics. In addition to providing free basic searches, Human Systems IAC performs other services on a cost-recovery basis:

- Distribute human factors and ergonomics technologies and publications
- Perform customized bibliographic searches and literature reviews
- Prepare state-of-the-art reports and critical reviews
- Conduct specialized analyses and evaluations
- Organize and conduct workshops and conferences

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